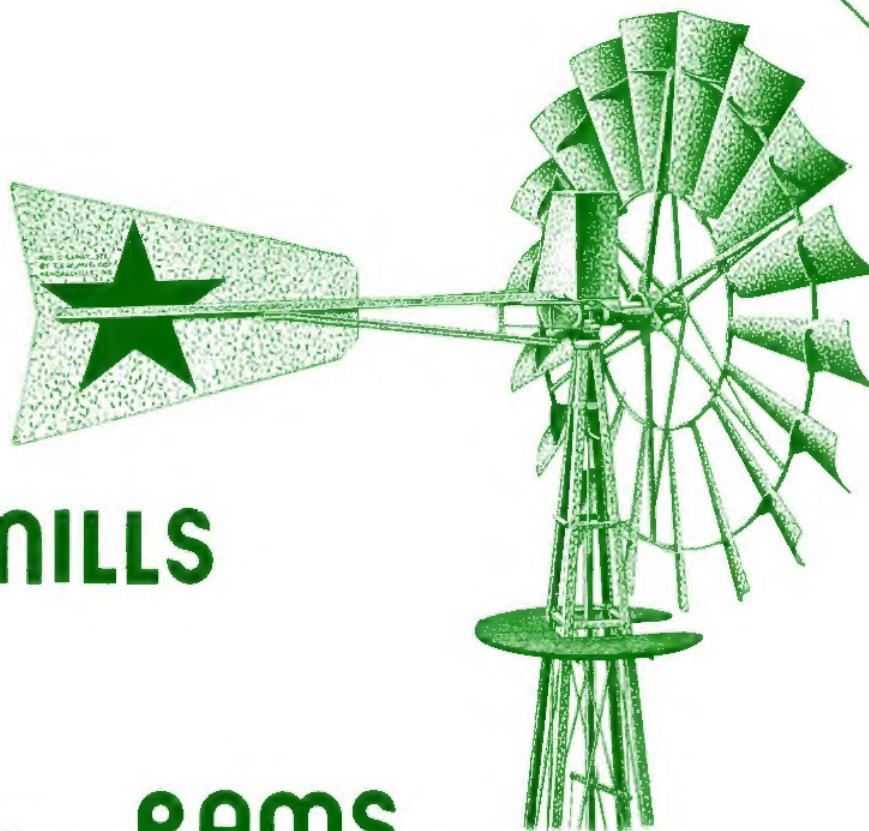
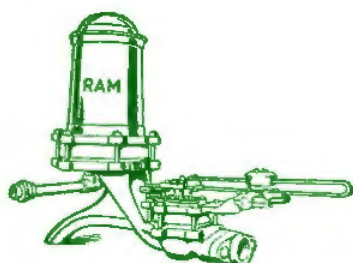


POWER WITHOUT FUEL

COMPILED BY
ALAN C. KING



WINDMILLS



RAMS

WATER MOTORS



1889 - 1942

MONOGRAPH NO. 7

CONTENTS

Articles

	Page
Windmills are Thrifty	4
Wind Electrics 47 years ago and now	5
Wind Generates Electricity	14
Making Water Pump Water	35

Windmills

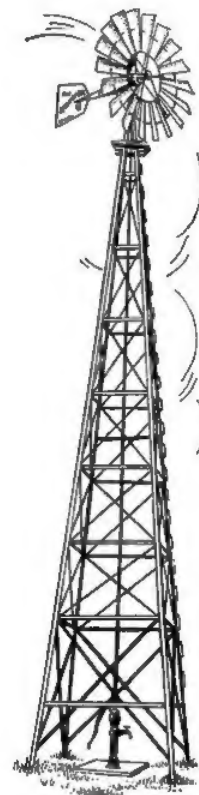
	Page
Aermotor Co.	7,8,9
Anderson Malleable Iron & Mfg. Co.	10
Appleton Mfg. Co.	10
Bucklen, Herbert E. Corp.	24
Challenge Co.	10,11
Currie Windmill Co.	10
Dempster Mill Mfg. Co.	11,12,13
Duplex Mfg. Co.	27
Elgin Windmill Co.	14
Fairbanks-Morse	15,16,17,18,19,20
Fairbury Windmill Co.	21
Flint & Walling Mfg. Co.	21,22
Freeman Mfg. Co.	23
Goold, Shapley & Muir Co., Ltd.	24
Heller-Aller Co.	23
Jacobs Wind Electric Co., Inc.	24,25
Kalamazoo Tank & Silo Co.	25
Leach Windmill & Tank Co.	25
LeJay Mfg. Co.	27
Manitoba Windmill & Pump Co., Ltd.	26
Mast, Foos & Co.	25
National Battery Co.	22
Ontario Wind Engine & Pump Co., Ltd.	26
Perkins Corp.	10,26
Philco Radio and Television Corp.	25
Queen Stove Works	31
Ruralite Engineering Co.	26
Sears, Roebuck & Co.	26,27
Stover Mfg. Co.	27,28,29
Universal Battery Co.	14
U.S. Wind Engine and Pump Co.	29
Wincharger Corp.	30
Wind Impeller Electrical Works	14
Wind Power Light Co.	22
Winger, E.B.	29
Woodmanse	31
Zenith Radio Corp.	31

Water Motors

Backus Water Motor Co.	32
Cherington Mfg. Co.	32
Divine Water Motor Co.	32
Edgar Mfg. Co.	33
Lippincott M.S. Co.	33
Morton Mfg. Co.	33
Norton Water Motor Co. Inc.	33
Rhodes, L.E.	32

Rams

Deming Co., The	34,36
Gawthrop, A. Jr.	35
Goulds Mfg. Co.	34
Hanson & Rhodes	35
Hutchison Mfg. Co.	34
Niagara Hydraulic Engine Co.	35
Power Specialty Co.	34
Rife Engine Co.	35
Utility Co.	35





Windmills Are Thrifty

trees within close distance the tower was only 20 feet high and an automatic regulator attached to the float in the tank controlled the windmill so that it was always well filled with water and required but passing attention.

In sections where there is considerable wind at all times during the growing season a substantial acreage may be irrigated if a sufficiently large reservoir is maintained. One Great Plains farmer with a 16-foot windmill and storage capacity for 47,000 gallons finds it profitable thus to provide water for 20 thirsty acres. He, too, says with my friend, "Our windmill is thrifty."

1936

according to the velocity of the wind, the diameter of the pump cylinder, the diameter of the wheel, and the lift required. By doubling the diameter of the cylinder, the capacity of the pump is increased four times.

With a lift of 100 feet, an eight-foot wheel with a two-inch cylinder would have a capacity of around 105 gallons per hour in a gentle wind, while a ten-foot wheel with a two and one-half-inch cylinder would have a capacity of approximately 160 gallons per hour.

One reason why my friend has obtained good results from the use of his windmill is that he was careful to follow the recommendations of the manufacturer in regard to its installation. A high tower gives the best possible wind exposure with the wheel well over 15 feet above all obstructions within 400 feet.

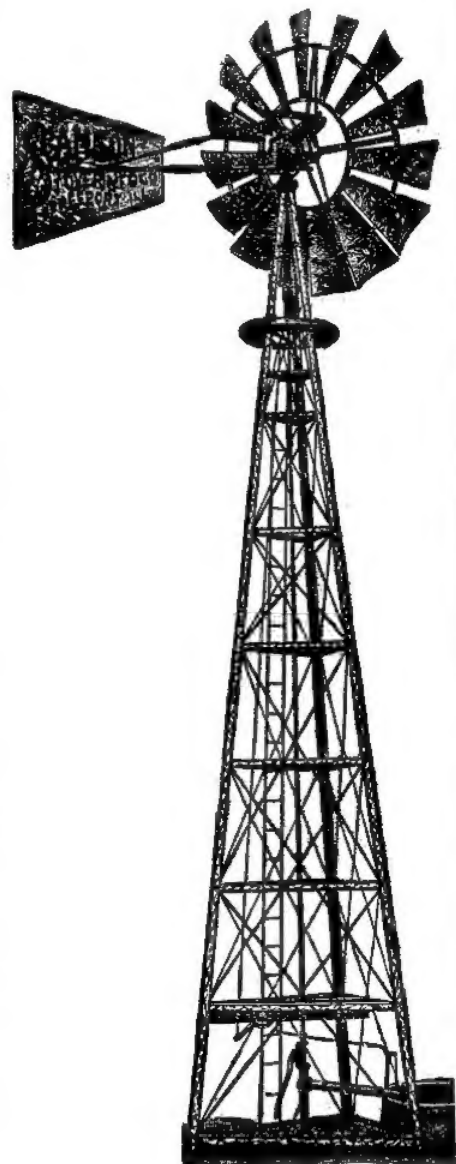
This farmer has a three-way pump which is protected from freezing with the water chamber and valve well below the platform. A float valve in his stock tank assures a supply and automatically turns off the mill when it is full. A turn of the valve can direct water into a nearby underground, hillside cistern in which he keeps a goodly reserve in case of several days of calm.

Outdoor supply tanks may be used in mild climates but in sections which have severe winters either an underground or well-protected supply tank is recommended. Dairy farmers in northern states have found it profitable to insure running water for drinking cups by placing a tank in the mow of the barn. If the barn is warmly constructed, the heat from the stock will keep the water from freezing, particularly if the precaution is taken to remove the flooring from below the tank.

When there is no other convenient place for the storage tank, it can be placed in the attic of the house but the strength of the floor joists in any building should be carefully considered in choosing the size of tank. It should be remembered that water is heavy, weighing more than eight pounds to the gallon, and it requires strong construction to support one of large capacity. A drip pan with a drain pipe is always recommended for use under a tank located in a building.

If it is desired to have water pumped from a spring or stream so the windmill cannot be placed conveniently over the source of supply, one of the special type shallow well pumps may be used. A check and waste valve should be supplied where the pipe branches off for the field tanks so that it can be drained when not used in freezing weather.

When on the farm we found an extra windmill in the back pasture especially useful for dry and young stock which were kept there. With no buildings or



"I BELIEVE the windmill is about the thriftiest machine on our farm," remarked an old neighbor of ours recently. "It uses free power, which otherwise would go to waste, to do one of the most important jobs on our farm. Our big supply tank has never been empty except when we have drained it for cleaning. The mill requires attention only once a year for oiling and works for us winter and summer without a dollar spent for repairs."

Thrifty people in many lands have been using windmills to pump water ever since the Romans and Bohemians discovered something of their value as early as 700 A. D., and today American windmills, because of their high efficiency, go all over the world. Recent improvements permit pumping in lighter winds, which makes them useful more days in the year and also increase their output of water.

The velocity of wind required to start the mill pumping water depends to a large extent on the size of the cylinder used, many making the mistake of selecting one so large that its usefulness may be limited to a rather strong wind. It should be loaded to begin pumping in a light wind with a velocity of from six to eight miles an hour and to do its best work in a moderate wind or one that attains a velocity of around 15 miles an hour.

A light wind shows its direction by the drift of smoke, rustles leaves and is felt lightly on the face. A gentle wind has a velocity of from eight to twelve miles an hour and is sufficient to extend a light flag and will keep leaves and small twigs in constant motion. Moderate winds, which blow from 13 to 18 miles an hour, move small branches and raise dust or litter. Fresh winds have velocities of from 19 to 24 miles and start small hardwood trees to swaying. For stronger winds the tension of the vane spring should be adjusted to turn the wheel automatically to an angle with the direction of the wind, which will reduce its speed.

The capacity of the windmill varies

Wind Electrics 47 Years Ago and Now

The American farmer and his wife are electricity conscious. They have read about great hydroelectric projects, they know that money at low interest rates is available for the extension of rural lines, and they have some reason to believe that society as it functions today in the U. S. A. aims to establish electric light and power as one of the bases of the American standard of living, in or out of urban centers.

What many of these farm families are not yet aware of is that high-line current is an economic impossibility where there is sparse population and no opportunity to develop much above a lighting load. Yet with expectations high and no understanding of the limitations of high-line electrification, many farmers are today refusing even to purchase gas-engine powered washers because they expect to be able to use an electric machine soon, in fact very soon.

There probably never will be a time when high-line current will be available for ranch service out in the cattle country, nor will there be many grain-farming sections of relatively large farms and few homes per mile where high-line current will pay. Yet that does not mean that electricity is an unattainable dream for those in such regions. The isolated plant, either engine, or wind-driven, is perfectly practicable. Tens of thousands are in use, and more will be sold in the future as comprehension of the place of the high-line and that of the isolated plant are better understood.

Right now, wind-electric plants are "news," because to many they are novel, and the allure of free power from the wind is irresistible. Yet wind electric plants are not new. In fact the group illustration on this page is reproduced from a description of such a plant published in the February, 1891, issue of *Farm Implement News*, 47 years ago. Mr. Marsh, our editor then, commented about the possibilities of electricity on the farm in the following discussion in this old issue:

"We believe that the practical lighting of country houses with electricity generated by wind power is a possibility, and that it will be successfully accomplished before the expiration of this century, unless meantime some better plan of lighting such houses than any now in use shall have been discovered.

"The writer well remembers when pine knots in the open fire place of a farm house disputed the use of the tallow dip or of the rag wick in a grease dish, the pine knots having the preference so long as they lasted; and our great men who all got their education by the light of the latter, according to their biographies, were more favored than the rest of us who couldn't always get the pine knots. After the candle came the lamps which used the 'burning fluid,' and finally coal oil, kerosene, with the various improvements in refining it and in the lamps for burning it, following. Probably nothing is

as yet any better for lighting farm houses and residences not connected with coal gas than refined kerosene oil and the best lamps. Gas machines, which simply vaporize gasoline, are not fully satisfactory, because the burners throw off too much smoke in combustion.

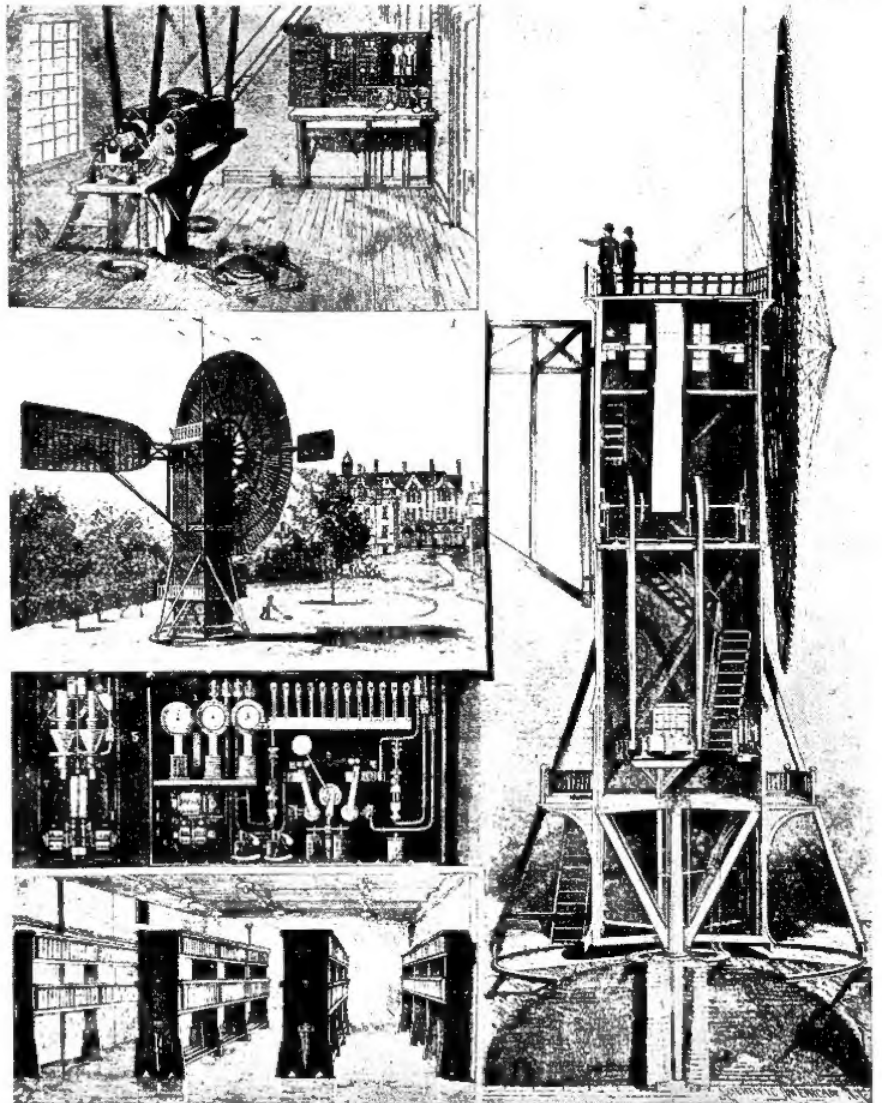
"Fifty years ago (in 1841) but few residences in cities were lighted by coal gas, and a dozen years ago the idea of the practical use of electricity for such purpose was derided by the newspapers, because Edison had been so slow in fulfilling his promises, and gas manufacturers were confident that their business would not be disturbed by the innovation, the electric light being then regarded generally as a curiosity, the proper thing to attract attention in front of a theater or in the office of a hotel, but not for practical lighting.

"It is only about a dozen years since the

Northern Illinois Hospital for the Insane made a contract with the Elgin Gas Company, the terms of the contract being that the said company should put in mains reaching out to the institution and furnish gas at a stipulated price, and that the hospital authorities should take and pay for same for a term of ten years. At the execution of the contract the writer, one of the trustees, objected to the length of the term, because, possibly, meantime electric lighting might become so practical that the institution would prefer it and suggested reducing the term to five years. To this the gas man readily consented, having, as he said, no fear of any trouble in that direction; but at the end of five years an electric plant was supplying better light to the institution at the same or less cost, much to the chagrin of the representative of the gas company.

"If within the next ten years, wind mills

1938



A wind electric plant of 1891, owned by Charles H. Brush of Cleveland, Ohio. Illustration reproduced from the February, 1891, issue of *Farm Implement News*. The generator had a capacity of 12,000 watts. The battery consisted of 408 cells each of 100 ampere-hours capacity. The current range was 70 to 75 volts. The tower weighed 80,000 lbs. and was supported on a collar on the gudgeon and rotated on the track. The plant had been in operation two years when this description appeared.

should be furnishing practical light to country houses by supplying storage batteries with the necessary electricity, it would not be anything more wonderful or difficult, apparently, than what has been accomplished during the last decade in the same line. Two or three years ago we noticed from time to time in the *Farm Implement News* the experiments that were then being made in France and Great Britain, particularly in Scotland; cottages and detached buildings were successfully lighted with electricity furnished by wind power; but the chief difficulty then, as reported, was in the imperfection of the storage batteries and not in the power. Other and various experiments have been made since, and while probably nothing sufficiently practical for ordinary use has been developed, progress has certainly been made to the extent that we fully believe the time is near when the thing will be accomplished."

Note that nearly half a century ago, it was recognized that the *storage battery* was the weak link in the isolated plant. It still is, but there is evidence that batteries now being built are so much more enduring that the high cost of battery depreciation is no longer a problem where the size of battery is in harmony with the generator capacity and the charging rate. This fact was brought out in the Fred Hawthorn article on wind plants published in our Feb. 10 issue.

Probably nothing "put over" the wind electric plant more than the development of the 6-volt farm radio of the Zenith people a few years back, coupled with a simple inexpensive wind charger available to keep the battery full. Farm folk wanted better radios, and the farm boys were simply hypnotized by the wind chargers. So "Dad" bought, and everywhere one goes through the country, one sees those little airplane-type propellers revolving smoothly and knows that some farm home has been inoculated with the virus of the wired circuit sustained by free wind.

Much thought has been devoted in recent years to the problem of governing wind electrics, for the wind that drives them is a very inconstant and fluctuating element, and line surges must be controlled if light filaments and motor windings are not to be burned out. The problem of charging in light breezes was pretty well solved with the development of the airplane propeller type of wheel by the Perkins and Bucklen interests, whose patents are now owned by the Universal Battery Co.

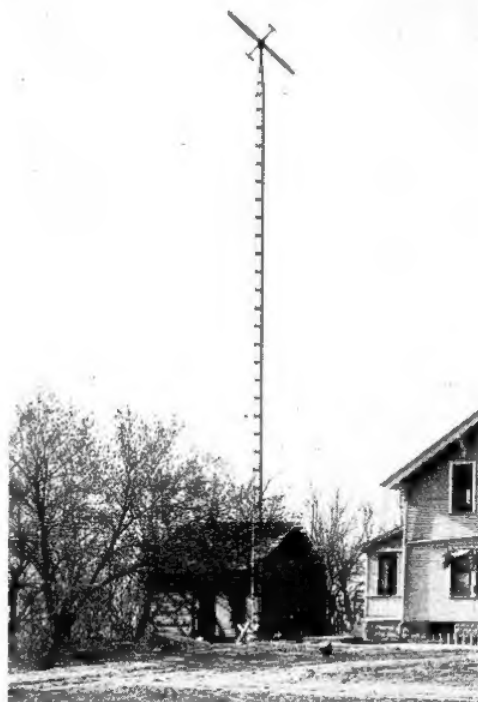
The first plant to control speed and hold it below dangerous velocities in high winds, so far as we know, was the Jacobs. This control is effected by a centrifugal governor which varies the angle of the blades as they face the wind, turning them edgewise as the speed increases. This patented method has proved quite effective, for the company vouches for the fact that none of the many large generators it has sold ever has burned out. The propeller speed is held under 300 R.P.M. with its direct-driven units and the



A Jacobs wind electric erected May 7, 1937, on the farm of H. A. Messerschmidt near Montello, Wis.

generator is designed to operate at this slow speed.

But there are more ways than one of skinning a cat. Not long ago, the Universal Battery people obtained a patent whereby the blade angle is altered not by centrifugal



A Wincharger mounted on a guyed mast type of tower. These are less expensive than the self-supported type tower.

force but by the varying electrical resistance of the batteries as the charging rate increases with the speed of the wheel.

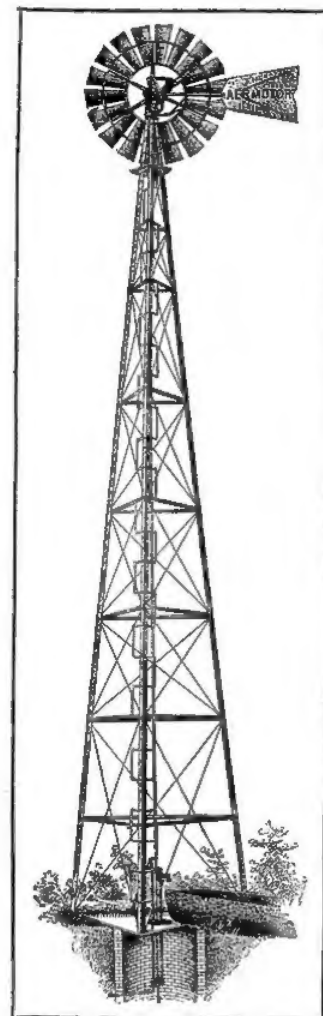
Another approach to the same end is noted in a recent patent issued to Palmer C. Putnam of Harwich, Mass., wherein the temperature of the generator varies the "angle

of attack of the blades." When the generator runs faster, it gets hotter, and that turns the blades edgewise.

Wincharger Corp., which put out the first 6-volt inexpensive units in such great quantities and now is pushing the larger plants energetically, depends upon centrifugal control of braking flaps rather than upon varying the attack angle of the blades. When their propeller reaches maximum speed, the balancing brakes are turned to expose their flat surfaces to the air, and this controls the speed.

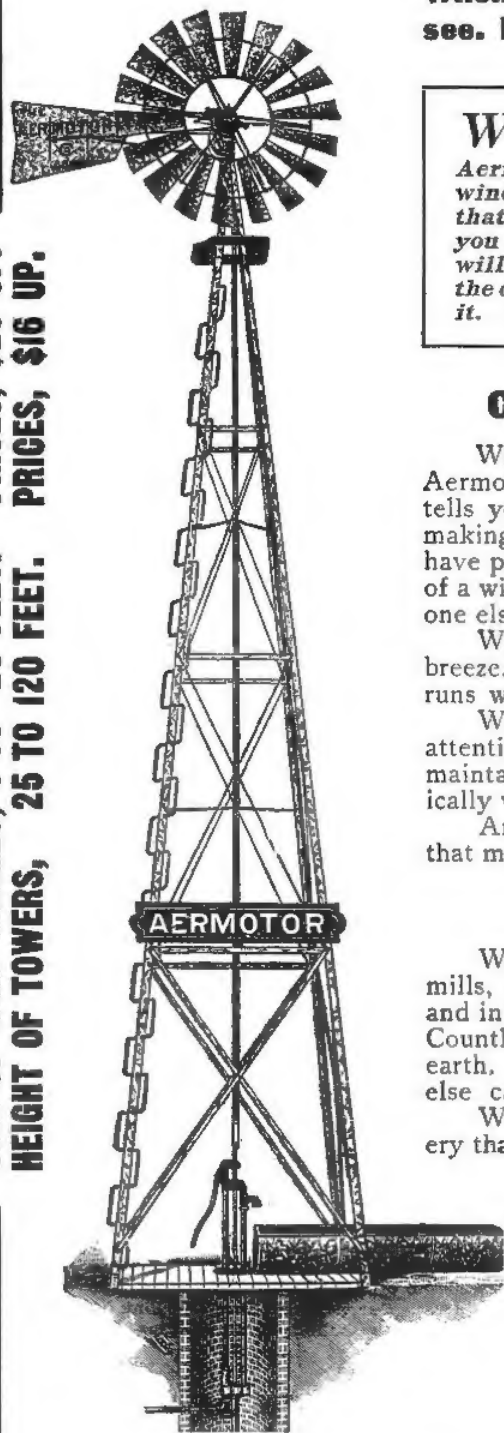
Other wind electric companies may have devised other methods of controlling propeller speeds, but if so we are not familiar with them.

So nearly a half century after workable wind electric plants were designed and built, we find the business taking on new life and receiving general acceptance as a practicable and economical means of obtaining electricity beyond the stretch of the high-lines. Today farmers are lighting their homes, milking their cows, refrigerating their food and operating stokers with current generated cheaply and reliably by the wind.



FREE BOOK ABOUT WINDMILLS

When you want a Windmill, don't buy the first you see. Learn all you can about them. Send for our book.



SIZE OF WIND WHEELS, 8 TO 20 FEET. PRICES, \$25 UP.
HEIGHT OF TOWERS, 25 TO 120 FEET. PRICES, \$16 UP.

We have issued a book that tells all about windmills. It begins with the Dutch windmills of 1400, and ends with the Aermotors of 1901. It contains 125 pictures to show you what windmills should do and what they should be. It tells all that invention has done for them. When you read this book you will know all that anyone knows about windmills. You will know the right kind from the wrong kind, and know all the differences. To avoid a mistake, don't buy without reading it. The book is free -- simply write for it.

COVERED BY FIFTY-FIVE PATENTS

When you know all about windmills you will buy none but the Aermotor. That is why we publish this book. We learned what it tells you before we made the first Aermotor. We learned it by making 5000 accurate experiments with 65 kinds of windmills. We have proved to a certainty just what is needed to get the utmost out of a windmill. We have discovered some hundreds of facts that no one else knew, and we have covered our discoveries by 55 patents.

We thus make a windmill that gets power from the slightest breeze. That is why the Aermotor is known as "The wheel that runs when others stand still."

We make a windmill that regulates itself; that calls for no attention, save oiling. In a zephyr or a gale the Aermotor pump maintains the same speed. A simple attachment stops it automatically when the tank is full and starts it when the water lowers.

And it lasts. Durability is of enormous importance in a wheel that may revolve 200,000 times daily.

HALF THE WORLD'S TRADE

We came into a field occupied by many great makers of windmills, backed by millions of capital. We came in without money, and in twelve years have captured half the world's windmill trade. Countless thousands of Aermotors now dot every country of the earth. We have done that by simple merit; by making what no one else can make.

We now make so many, and have so much labor-saving machinery that no one can compete with us, even in price.

WRITE FOR THE BOOK

Our book tells the features that control for us half the world's trade in this line and will win your trade when you know them. And if you buy without knowing them, you will never cease to regret it.

For your own sake we ask you to read what our book tells about windmills, before you select one. Write for it now, before you forget it. A postal card will do.

AERMOTOR CO., 1201 TWELFTH STREET, CHICAGO

We have another book about Power Aermotors for doing all sorts of work—for grinding, for sawing, for cutting feed, shelling corn and running many kinds of machinery. This book is free, too. Also a book about Pumps, Tanks, Substructures, Pipes, Fittings and all sorts of Water Supply Goods. We make 160 Tons of Piping daily.

1901

The Auto-Oiled Aermotor

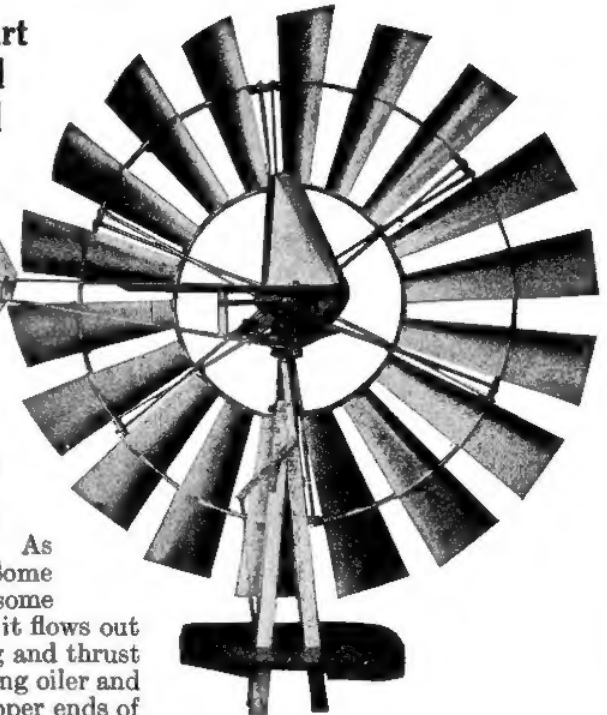
A REAL SELF-OILING WINDMILL

With Duplicate Gears Running in Oil

A year's supply of oil is sent with every Aermotor. Empty this can of oil into the gear case when the mill is erected, and you need not think about oiling again for a full year. The oiling arrangement is complete in every detail and perfectly automatic.

A constant stream of oil flows on every bearing. The shafts run in oil. Every cog is covered with oil. There is oil everywhere, yet none escapes, because all surplus oil flows back into the gear case to be used over and over again.

**Every Working Part
is Constantly and
Completely Oiled**



The illustration below enables you to look thru the gear case and helmet and see the interior parts of the motor. The horizontal lines in the gear case indicate the oil and they show how the lower part of the large gears is always submerged in the oil. As the gears revolve they carry a flood of oil up onto the pinions. Some of this oil flows off into the bearings on each side of the pinions, some of it runs down into the bearing for the large gears, a part of it flows out into the arm which supports the wind wheel and oils the bearing and thrust washers within the hub. A small part of it is picked up by the ring oiler and deposited on the shaft which carries the guide roller and the upper ends of the pitmen. Every working part is fully and constantly oiled. Friction is

practically eliminated and the Aermotor runs in the lightest breeze. This is most important in the summer months when the winds are frequently very light.

Phantom View of the Motor



The Helmet, or Hood, covers all of the working parts of the mill. No rain can get in to flood out the oil. No dust can blow in to grind out the bearings. No oil can splash out.

The ability of the Aermotor to run in light winds is due to some very important features which are most perfectly worked out in this windmill. First and most important is the correct design of the wheel. The proper size, shape, curvature and angle of the sails were determined by most exhaustive experiments. Added to the correct design of the wheel, is its ability to face up to the lightest winds. The turntable is small and well oiled so that the mill is very sensitive to the direction of the wind. When perfect lubrication is added to the best that is possible

in design and construction, the result is a windmill which gives the best and the most service.

More water is pumped by Aermotors, for stock and domestic purposes, than by any other kind of pumping machinery. They do their work silently, surely and satisfactorily. You cannot travel far

today without seeing an Aermotor standing out as the most prominent object in the landscape. Go to any any part of the inhabited world and you will find the Aermotor there ahead of you. They are used everywhere because they have been found to be the most economical and most reliable device for pumping water.

AERMOTOR CO. CHICAGO

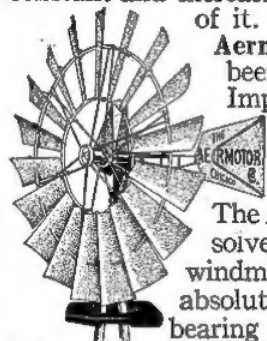
1923

CHICAGO **AERMOTOR CO.** DALLAS
DES MOINES KANSAS CITY MINNEAPOLIS OAKLAND

A WONDERFUL SUCCESS

"Nothing succeeds like success," they say, but where success is constant and increasing there must be some unusual merit back of it. The continued success of the **Auto-Oiled Aermotor** is based entirely on merit. It has been made better and better year after year. Improvements have been added as experience has shown the way. The **Auto-Oiled Aermotor** of today is a wonderfully durable and efficient windmill.

The Aermotor Company, more than 12 years ago, solved the problem of complete self-oiling for windmills in such a way as to make the system absolutely reliable. The oil circulates to every bearing and returns to the reservoir with never a failure. There are no delicate parts to get out of order. The double gears run in oil in a tightly enclosed gear case.



CHICAGO **AERMOTOR CO.** DALLAS
KANSAS CITY DES MOINES OAKLAND MINNEAPOLIS

1927

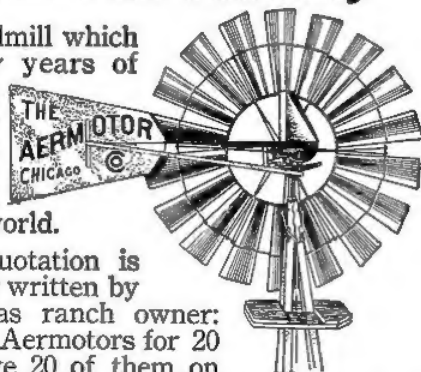
IMPROVED AERMOTOR

The Windmill for Economy

There is no windmill which will give so many years of satisfactory service as the **Improved Aermotor**. This is the verdict of windmill dealers and users all over the world.

The following quotation is from a recent letter written by a prominent Texas ranch owner: "I have been using Aermotors for 20 years and now have 20 of them on my ranches. The upkeep on them is practically nothing. They will run in less wind than any other windmill. I have bought nothing but Aermotor mills for the last 15 years. When I have erected an Aermotor over a well my water troubles are over."

Hundreds of thousands of Aermotor users have had the same long and satisfactory experience. You can do your customers no greater favor than to sell them an Aermotor, or where electricity is available, an **Aermotor Deep Well Electric Pump or Automatic Water System**. We make only the most dependable pumping equipment.



1935

AERMOTOR CO.

2500 Roosevelt Road, CHICAGO

BRANCHES:

Dallas Des Moines Kansas City Minneapolis Oakland

Tremendous Power from the Wind

THE Aermotor Co. is now making a self-oiling windmill 20 feet in diameter. If you have a well 1000 feet deep, or if you want to raise a large quantity of water from a shallower well, this is the windmill you need. This new **Auto-Oiled Aermotor** weighs nearly 2½ tons without the tower. It is a giant for power.

Whatever your water requirements may be there is an **Auto-Oiled Aermotor** of the right size for the work. They are made from 6 feet to 20 feet in diameter. Use the smaller sizes for the shallow wells and the larger ones for the deep wells or large quantities of water. Our tables, sent upon request, tell you just what each size will do.

The **Improved Auto-Oiled Aermotor**, the genuine self-oiling windmill, is the most economical and the most reliable device for pumping water. It works every day and will last a lifetime.

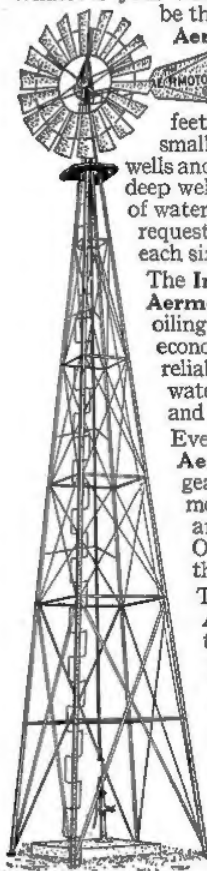
Every size of **Auto-Oiled Aermotor** has double gears running in oil. All moving parts are fully and constantly oiled. One oiling a year is all that is required.

The **Auto-Oiled Aermotor** is made by the company which originated the steel windmill business. For full information write

AERMOTOR CO.
2500 Roosevelt Rd.
CHICAGO

Branch Houses:
Dallas Des Moines
Oakland, Kansas City
Minneapolis

1928



NO CLIMBING OF TOWERS IN OURS
Every bearing is constantly flooded with oil. Two quarts of oil in the gear case of the 8-foot Auto-oiled Aermotor will keep the gears and every bearing flooded with oil for a year or more. With its duplicate gears and two pitmen lifting the load straight up.

DUPLICATE GEARS RUNNING IN OIL
Oil Annually
EVERY BEARING FLOODED WITH OIL

It is unbreakable. It runs in a breath of air. The galvanized helmet covers the gears, keeps out rain, keeps out dust, keeps in oil. If you are tired of climbing a windmill tower; if you are tired of buying repairs and having them put on; if you are tired of waiting for a big wind, let us furnish you this self-oiling, over-going mill to go on any old tower. It costs but little and you will get the difference between no water in a light wind and an abundance of water in almost no wind. Write
Aermotor Co., 1146 S. Campbell Ave., Chicago for a mill.

1915

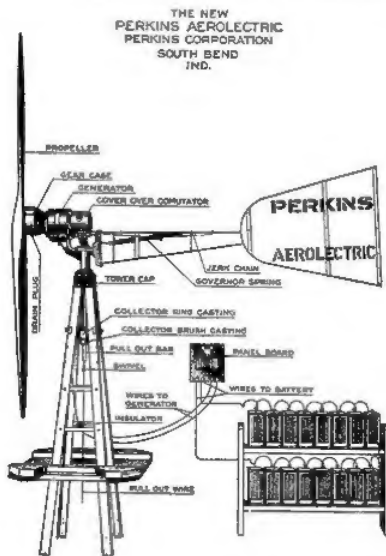
New Aeroelectric

POWER from the wind is now being used to give the farmer electricity. The plant shown here has been developed by the Perkins Corporation of South Bend, Ind., in the last three years. During this time a great deal of experimenting has been done. Early efforts proved the possibilities of using wind power for generating electricity.

Recently a departure was made from the earlier ideas and the aeroplane type propeller was adopted, in place of the regulation wheel. By the use of a scientifically designed aeroplane type propeller that weighs only 18 pounds, more current can be generated than that obtained from a 14-foot wheel weighing 400 pounds.

"The important advantages derived from the use of this light propeller," says the manufacturer, "are: the lighter weight construction of mechanism, less than 300 pounds, as compared with 1,500 pounds.

"All danger from storms is practically



eliminated, except cyclones, the propeller exposing but five square feet of surface to the wind, while the 14-foot wheel exposed 95 square feet.

"We do not hesitate to recommend this plant to any one not requiring to exceed 50,000 to 60,000 watts a month on the average the year 'round, as many plants now in operation are furnishing this service which is far more than used by the average farmer, according to the United States Government statistics."

The Aeroelectric is intended for lighting house, yard and barns and for operating electric fans, irons, washing machines, vacuum cleaners, water pressure systems, etc.

Any motor up to one and one-half horsepower can be driven by the Aeroelectric, according to the manufacturer. This will include milkers, separators, shearing machines, grinders, etc. It is said the Aeroelectric does this with virtually no expense and a minimum of attention.

1925



Rex Wind Mill.

Galvanized Steel.

Is the standard. A galvanized steel mill and tower insures permanent rigidity. Only a few parts, not a complicated machine. Light running. Practically no lost motion or friction. Self regulating in heavy wind. Strong guarantee. Agents wanted. Write to-day for large illustrated catalogue. Box A.

Anderson Malleable Iron & Mfg. Co., Anderson, Ind.

1902

Appleton-Goodhue Wind Mill.

A full wheel with double arms of heavy channel steel, engine way guide, self-oiling boxes, covered gears, a perfect governor, a noiseless brake, etc. Prices right.

Towers guaranteed against cyclones and tornadoes.

Illustrated Catalogue describing them and our famous grinders, cutters, shellers, wood saws, huskers, horse powers, etc., free. APPLETON MFG. CO., 13 Fargo St., Batavia, Ill., U.S.A.

1903

\$10.00 Sweep Feed Grinder.

We manufacture all sizes and styles. It will pay you to investigate. Write for catalog and price list.

\$14.00 Galvanized Steel Wind Mill.

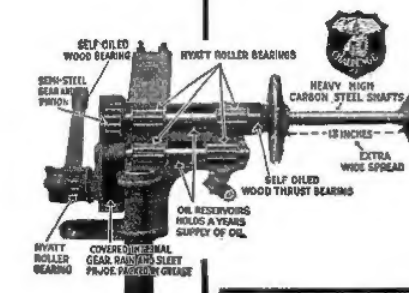
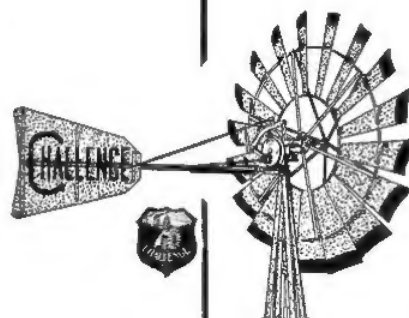
CURRIE WIND MILL CO.,
Seventh St., Topeka, Kansas

1908

1923

Challenge Self-Oiling Mill

Lightest Running, Simplest, and Most Durable Mill Made



Five Large HYATT Roller Bearings. (Same as used on your tractor or automobile.)

Semi-Steel Gear, Pinion, and Rocker Arm. (25% stronger than cast iron.)

Large Oil Reservoirs that hold one or two years' supply.

Self regulating and storm proof.

Oil but once every one or two years.

Easily repaired — Easily erected.

Send today for our three-colored folder containing full description

CHALLENGE COMPANY
181 River Street Batavia, Ill.

Manufacturers of
CHALLENGE Engines, Wood Saws, Feed Grinders, Ensilage Cutters, Pumps, Cylinders, Tanks, Corn Shellers.

Branches — Kansas City, Mo. — Omaha, Nebr., Minneapolis, Minn.

60 Years Experience Behind This Windmill

1920

Perkins have built good wind-since 1860. Some of the first mills are still running. This experience guarantees you satisfaction and all worth while improvements when you buy

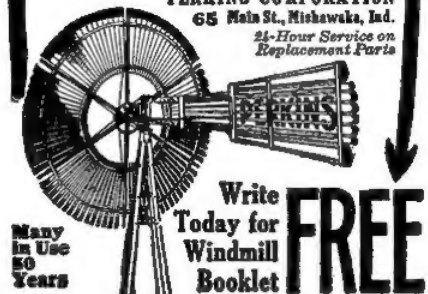
PERKINS WIND MILLS
Standard for 60 Years

Get our experts' advice on right kind of mill for your well. We make all types. Direct Stroke, Wood or Steel Wheel; Back Geared Mills for deep wells.

Oilless replaceable bearings. Improved automatic regulator. Power stroke exactly centered between bearings. Simple, quiet, powerful. Require minimum attention. Work in lightest breeze.

Get all the facts NOW. Write today for Windmill Booklet Free.

PERKINS CORPORATION
65 Main St., Nishawau, Ind.
24-Hour Service on Replacement Parts



The Dandy Irrigator Wind Mills

NOTHING TO COMPARE WITH THEM

Note its **Simplicity, Compactness, Immense strength**

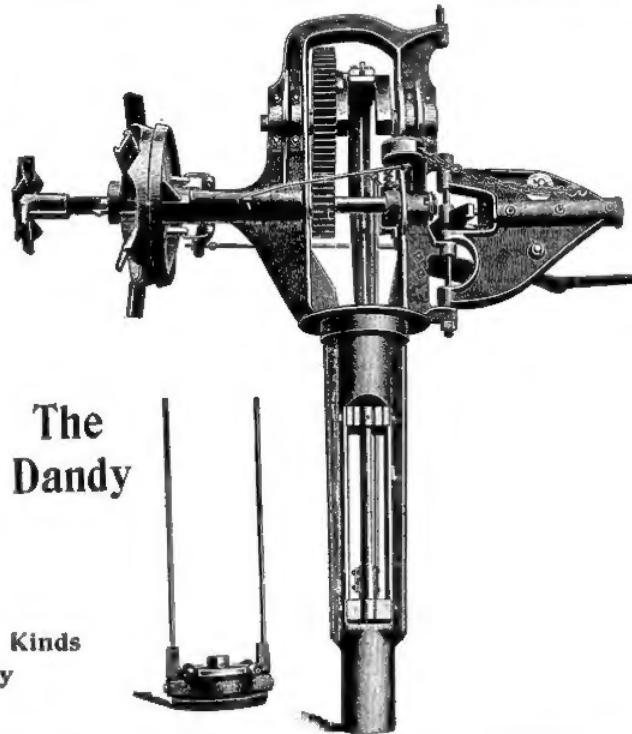
Brass or Graphite Bearings.

Roller Bearings for Turn Table.

Heaviest and Strongest Wind Mill ever offered for sale.

It is everlasting and has no equal.

Headquarters for all Kinds
of Water Supply
Goods.



This cut shows the working and wearing parts of our large sizes of Dandy Mills.

They are particularly adapted for irrigation pumping.

Write for Catalog

BRANCH HOUSES:

DALLAS, - - TEX.
KANSAS CITY, - MO.
MINNEAPOLIS, - MINN.
OMAHA, - - NEB.
136 Liberty St.,
NEW YORK

Challenge Wind Mill & Feed Mill Co., Batavia, Ill.

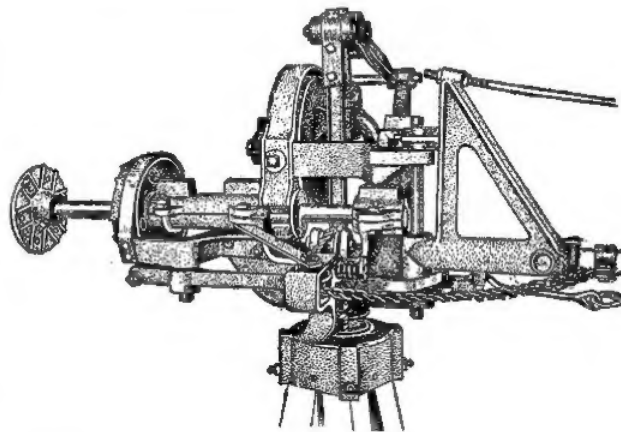
1903

BEST TO BUY ——— BEST TO WORK

Look
Carefully
at the Best

**Windmill
Head**

Ever Made



See that
**Extra
Bearing**

on the
Wheel Shaft
and the

**Center Lift
Crank
Roller Rim
Gears**

and other good
things

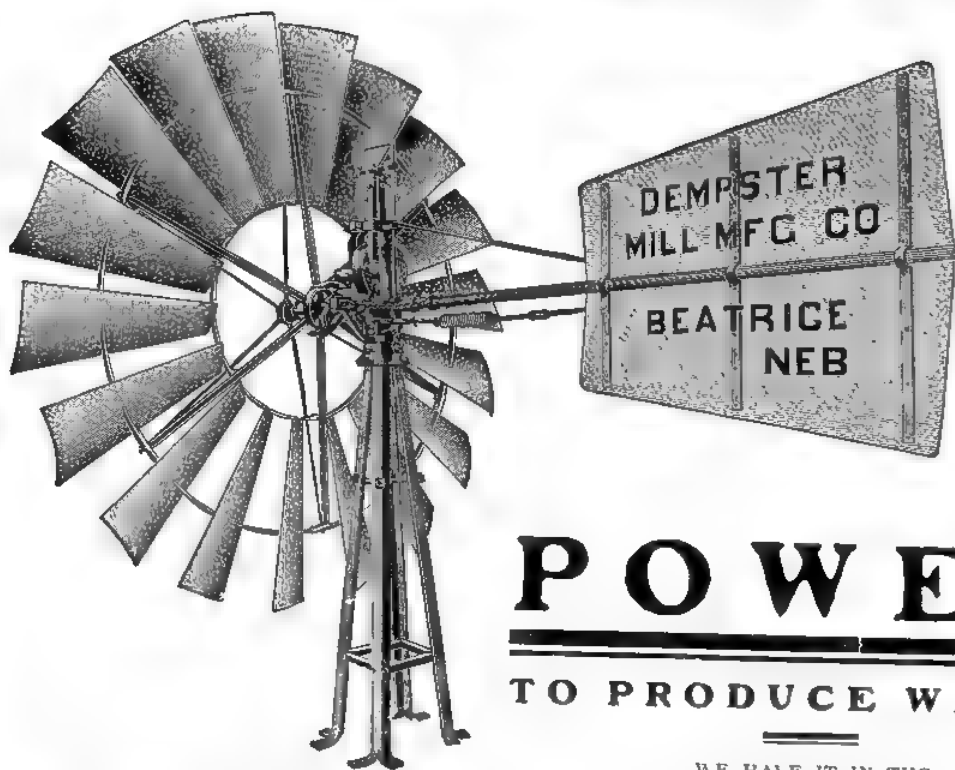
DEMPSTER MILL MANUFACTURING CO.

FACTORY: BEATRICE, NEBRASKA

Branch Houses: Omaha, Neb. Kansas City, Mo. Sioux Falls, S. D.

Mention Department "A" when you write

1908



POWER

TO PRODUCE WATER.

WE HAVE IT IN THE
DEMPSTER STEEL WIND MILL

Sizes: 6 to 16 feet

WE MANUFACTURE A COMPLETE LINE

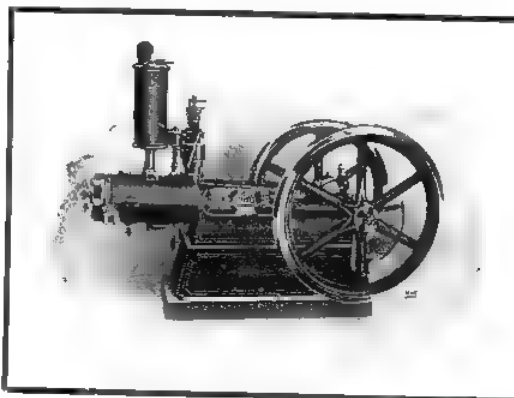
WATER SUPPLIES

STEEL WIND MILLS AND TOWERS.
 VANELESS AND SOLID WHEEL MILLS.
 PUMPS, CYLINDERS, TANKS, ETC.

We can please you. Try us.

If you wish to be independent of the varying winds, get a **Dempster Gasoline Engine**. Made in 2, 3½, 6, 8 and 16 H. P. They are very simple, being free from the intricate devices which characterize so many engines. **They are Powerful and Reliable.**

Dempster Well Machinery affords the best way of making wells in any formation. You can use Horse Power, Steam, or Gas Engine. We will gladly send illustrated reading matter concerning any of our goods and supply any information which we can give.



Dempster Mill Mfg. Co.

FACTORY: BEATRICE, NEB.

Branches: Kansas City, Omaha, Sioux Falls, South Dakota.

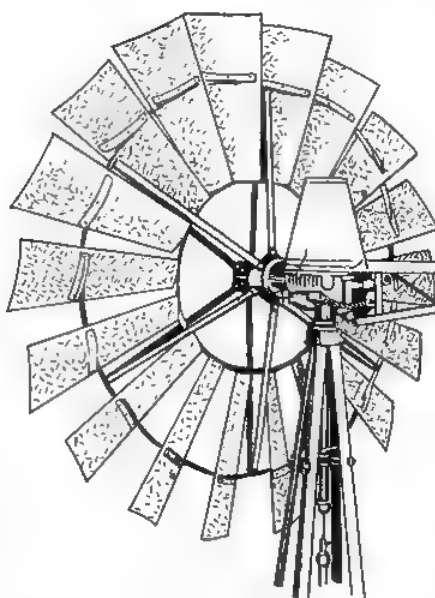
1903

DEMPSTER

No. 12

Self-Oiling Hyatt Roller Bearing Back Geared Windmill

Perfectly lubricated and well regulated. Straight Lift gives greater power with less wind effort.



Works More Days
Pumps More Water



Hyatt Roller Bearings
Two Pitmans
Two Strokes
Easy Running
Positive Brake

Write for Large Circular

Manufactured
by

DEMPSTER MILL MFG. CO.,

BEATRICE,
NEB.

Kansas City

Omaha

Branch Houses

Sioux Falls

Denver

Oklahoma City

1924

1931

NOW... NEW IMPROVEMENTS

... Make This Mill a Better Seller!

TUNE in on the Dempster Breakfast Hour Program over Station KFAB, Lincoln, Nebraska. Every morning, 7:00 to 7:30 A.M.

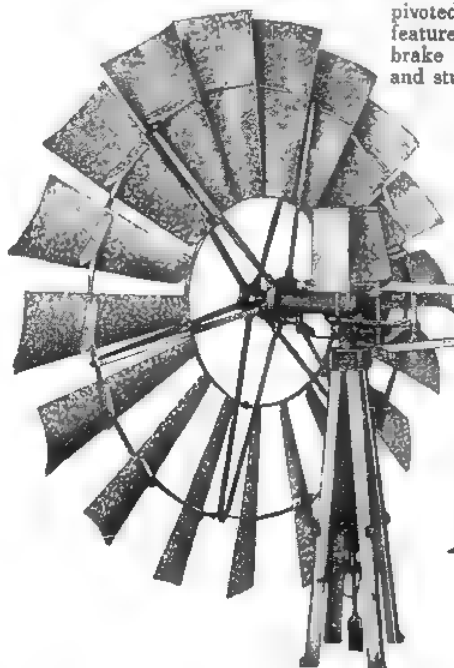
ALWAYS a step ahead . . . the Dempster No. 12 Annu Oiled Windmill now boasts many new outstanding improvements . . . which will be very effective in increasing sales. Among these are the New Internal Expanding Brake—the New Bearing Arrangement and the New Pullout Tube.

New Internal Expanding Brake has a heavy cast shoe with special steel brake lining, and is pivoted on substantial supporting lugs cast integral in the frame. It combines the best features of both steel band brake and cast shoe brake. Flexibility of steel lining allows brake to be applied gradually and still holds wheel firmly against rotation, while rigidity and sturdiness of shoe prevent dragging and squeaking.

The *New Bearing Arrangement* that further minimizes friction and allows the Dempster No. 12 Windmill to run in the still lighter winds.

The *New Pullout Tube* is simple, sturdier and more efficient than ever before.

Many Other Outstanding Features combine to make the Dempster a superior mill . . . and a good seller. *Write Today* for complete information on this mill.

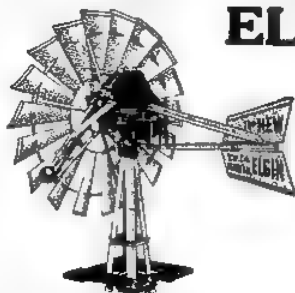


DEMPSTER

**NO. 12 ANNU-OILED
WINDMILL**

**Dempster Mill
Mfg. Company**
Beatrice, Nebr.

Branches: Omaha, Nebr.; Kansas City, Mo.; Oklahoma City, Okla.; Denver, Colo.; Sioux Falls, S. Dak.; Amarillo, Texas; San Antonio, Texas.



ELGIN WINDMILLS

Easier Sales — More Profits

New Elgin Model R—Streamlined, with Timken roller bearings, machine cut gears, adjustable stroke, fewer working parts, longer guarantee, lower cost . . . Sell the mill that government engineers selected over all other makes for the largest farm project of 1937

Dealers: Write Elgin for New Catalog "A" on Most Complete Line Windmills, Electric and Engine Driven Pump Jacks.

ELGIN WINDMILL COMPANY, Elgin, Ill.

MINNEAPOLIS KANSAS CITY DALLAS HOUSTON

Oil-bath Elgins are tornado-tested shipped completely assembled with Free 5 ft. tower top, pump-red, oil.

1939

UNIVERSAL LIGHT AND POWER PLANTS

Driven by the wind and constructed to operate smoothly with virtually no attention, Universal wind-driven Light and Power Plants offer the convenience of economical electricity. Made for both 32 and 110-volt service, and special 6-volt models for charging radio batteries. Many of your customers are live prospects for this type of equipment.



UNIVERSAL BATTERY COMPANY

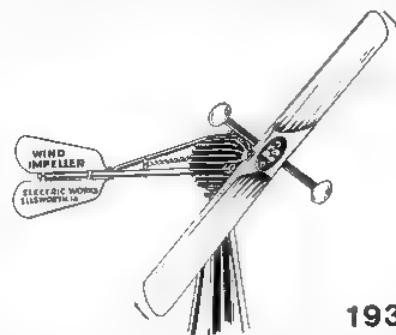
3248 South LaSalle Street

CHICAGO, ILLINOIS

1936

New Wind Electric Plant

The Wind Impeller Electrical Works, Ellsworth, Iowa, announce that they are in production on their new Wind Driven Electric Unit. The manufacturers state



1936

that this new unit has many advanced engineering features. It is self-controlled, preventing it from charging or over-loading batteries in the higher winds. It is offset so that the wind pressure will automatically fold it out of the wind when storm winds are blowing

An important feature of this unit is the inside and outside air-cooled generator. On its high tower the Wind Impeller generator, with deep air-cooled vanes allowing the free circulation of air, keeps remarkably cool and produces a high output even in the extreme warm weather. High powered propellers with fly weight stabilizers produce maximum power and even charge rates in all winds.

The Wind Impeller plant will be sold through dealers and offers excellent sales possibilities in rural communities. 32-volt plants are available in sizes from 1200 to 2400 watts. Price range of 32-volt plants is from \$488 to \$710, f. o. b. factory, including tower and complete set of large batteries. 110-volt plants are available in sizes from 2400 to 4800 watts.

Wind Generates Electricity

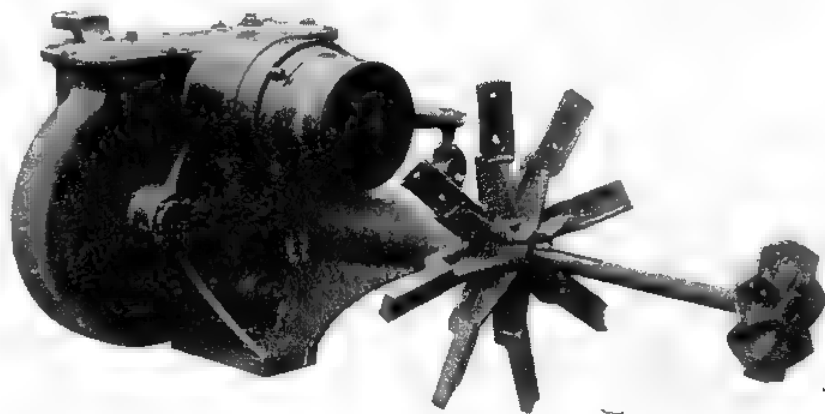
FOR more than twelve centuries man has used wind power in various ways—thru the windmill for water pumping and by sails to propel ships. However, during the last few years this same power has been put to work generating electricity for use in isolated places, especially on farms where electricity is not available.

Shown in one of the accompanying illustrations is a wind power electric generating outfit installed on a farm, while the second illustration shows the generating mechanism with the gear case cover removed. This windmill generates electricity when conditions are favorable and stores it for use as needed. The wind wheel is 14 feet in diameter and is set on a tower 50 feet high. The outfit includes the wind wheel, generator, switchboard, battery and tower. The wheel develops as high as three horsepower in a 30 miles per hour wind.

From the generator the current is carried thru a collector brush to a panel board and storage batteries set in a house convenient to the tower. The

panel has an automatic device that cuts in as soon as the wind is fast enough to begin charging, which is six miles an hour. The batteries are the reservoir

which is sufficient to light the average farm for eleven days without wind. The tower can be erected at any distance from the house up to 600 feet, which



The Generating Apparatus That Is Mounted on the Windmill.

into which the current is "pumped" and from which the current may be drawn.

The outfit charges in winds ranging from six to thirty miles an hour. The battery capacity is 240 ampere hours,

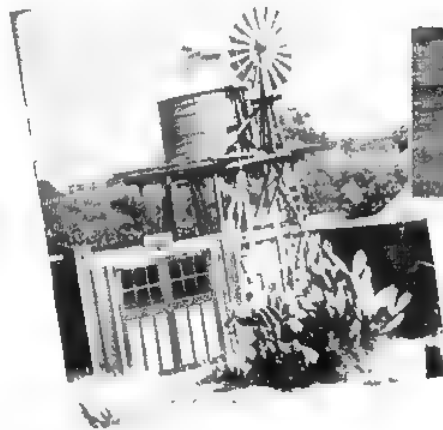
permits the selection of a location on higher ground.

1927

Fairbanks-Morse

Eclipse Windmills

THE PIONEER



For over sixty years Fairbanks-Morse Eclipse Windmills have furnished low cost power for Suburban homes and farms. Even today with highlines trans-versing most of the country the Windmill has a very definite function. Once installed, there is practically no operating cost, for the air is free. Windmills are therefore, the most economical source of power for keeping stock tanks filled and for irrigating fields.

It is possible to install Fairbanks-Morse Eclipse Windmills in connection with a Fairbanks-Morse Deep Well head where a pressure system is desired to

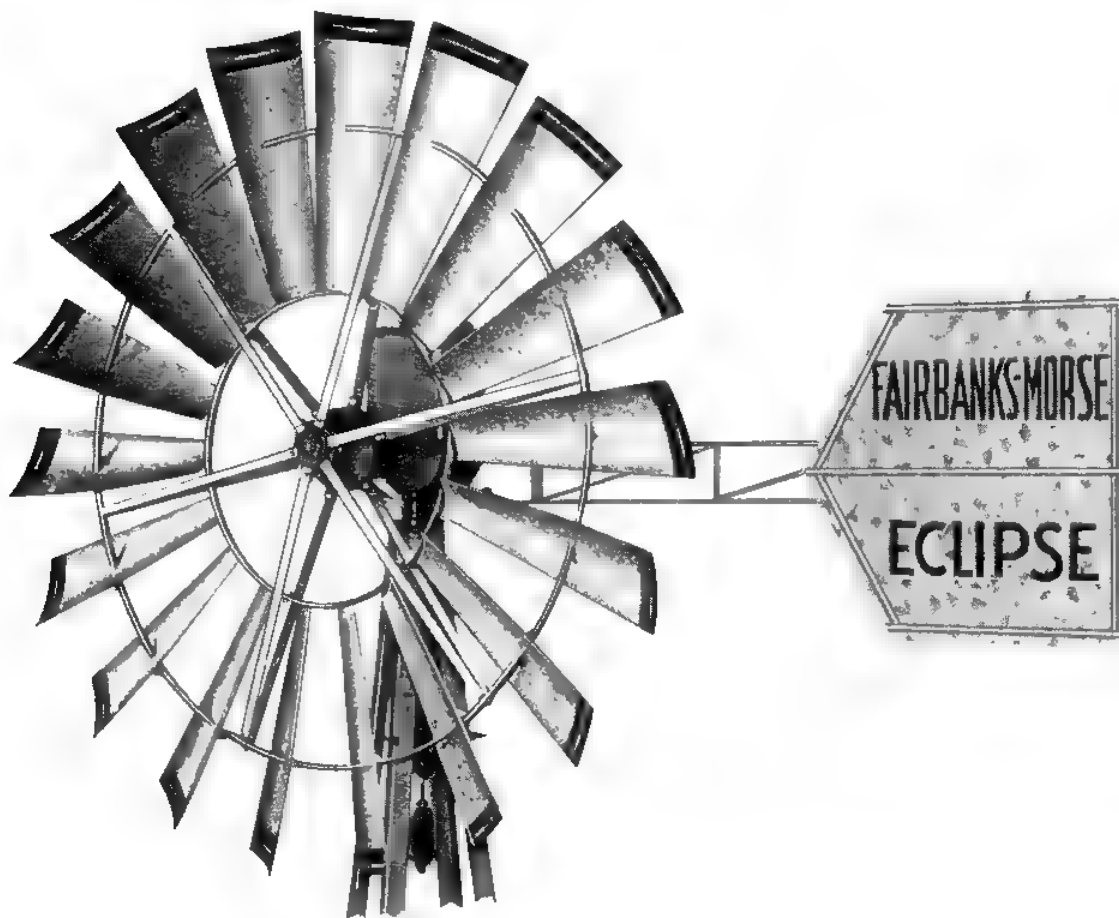
furnish water for the home. When the well casing is 6" or more in diameter and it is possible to install a Windmill on the same well with a Fairbanks-Morse Ejector pump. Fairbanks-Morse also offer a complete line of pump jacks and hand pumps with Windmill attachment.

A Windmill installed with elevated tank will itself furnish water pressure for homes provided the tower is located higher than the highest point in the home from which water would be furnished.

1942

STANDARD F-M ECLIPSE WINDMILLS

Self-Oiling-Roller Bearing



Made in two sizes—8 ft., and 10 ft. All sizes have adjustable strokes.

The Eclipse is an easy running, quiet operating self-oiling roller bearing windmill that faithfully fulfills the tradition of Eclipse durability and performance.

SIMPLE IN DESIGN: No complicated parts — no surplus weight — sturdily built.

TWIN GEARS: Both main gears and pinions are machine cut stub tooth gears. Load and strain are carried equally by both gears, overcoming excessive wear. This results in balanced action.

ROLLER BEARINGS: Two on the wheel shaft and one split type replaceable babbit bearing on the gear shaft. These greatly contribute to the efficiency of the mill in operation.

SELF-OILING: Pivot housing serves as an oil reservoir, keeping the wheel shaft and crankshaft bearings flooded with oil at all times. The main gears, pinion and lower crank arm bearing likewise operate in a bath of oil. (See sectionalized view). The cross-head assembly is lubricated thoroughly by means of a displacement type plunger.

SEALED HOUSING: The mechanism of the mill is protected from dust, rain, sleet and snow by a hood of heavy, rust-proof galvanized steel. Packing, cemented in the groove around the edge of the hood, forms an effective seal when the hood is clamped in position. Prevents contamination of the oil.

TURNS IN LIGHT BREEZE: The roller bearing construction, coupled with the perfect lubrication of the mill, insures an easy operating internal mechanism. *The Eclipse starts sooner, pumps longer!*

SELF REGULATING: The speed of the mill is automatically regulated by a coil spring governor so that the correct wind wheel speed and number of piston strokes per minute are maintained. Governing action starts when the wind exceeds 18 miles an hour and when the mill reaches a dangerous velocity — 25 miles an hour or more — the mill is swung completely “out of gear.”

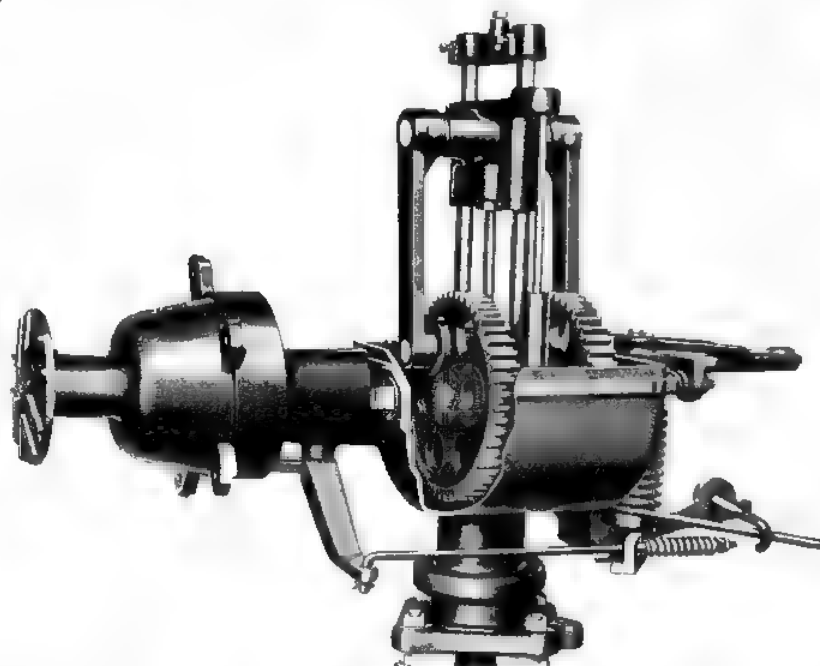
BALL BEARING TURNTABLE: Standard equipment on all mills. Makes it possible for the vane to turn the mill into the wind on the slightest breeze.

HAND PULLOUT: The hand pullout rod is brought down outside of the pivot pipe. This prevents friction with the moving pump rod and resultant excessive wear.

1942

TO FARMERS
WITHOUT
PRIORITY

TO OTHERS
WITH PRIORITY



ADJUSTABLE STROKE: The 8 ft., and 10 ft. sizes have adjustable strokes. Change of stroke may be made without difficulty—no new parts required—no change of gears. Crimped end for additional strength.

WIND WHEEL: Sails are made of special stiff, galvanized steel, permanently curved — substantially riveted in shape.

WHEEL GIRTS: The wheel girts are bolted to the wheel arms and the arms are bolted to the wheel spider by means of $\frac{3}{8}$ " galvanized machine bolts. Galvanized

lock washers are provided so that when the bolt nuts are tightened they cannot work loose.

REGULAR EQUIPMENT: With each Eclipse windmill are furnished 36 feet of wood pole, a swivel, bed and guide plate, ball bearing turn-table, pump slide, and pullout lever. Limitations on shipping containers may make it impossible to include a filling of oil. In this case use any brand of SAE No. 10 oil.

BRAKE: Heavy cast construction brake shoe acting on inside of spider thus eliminating freezing and breaking in cold weather.

PUMPING CAPACITIES STANDARD ECLIPSE WINDMILLS

Cylinder	8 FT. ADJUSTABLE			
	6" Stroke		4 1/4" Stroke	
	Gal. per Hour	Feet Head	Gal. per Hour	Feet Head
1 1/4	100	225	85	250
1 1/2	120	190	100	230
2	145	165	115	195
2 1/4	170	140	145	170
2 1/2	220	115	175	145
2 3/4	255	105	215	120
3	310	95	260	105
3 1/2	430	80	340	95
4	550	65	440	75
4 1/2	710	50	540	60
5	875	35	765	45

Cylinder	10 FT. ADJUSTABLE					
	8" Stroke		7" Stroke		6" Stroke	
	U. S. Gals. per Hr.	Total Head in Ft.	U. S. Gals. per Hr.	Total Head in Ft.	U. S. Gals. per Hr.	Total Head in Ft.
1 1/4	130	365	115	425	95	470
1 1/2	150	315	135	370	110	410
2	175	260	160	295	125	345
2 1/4	215	220	195	255	165	290
2 1/2	230	165	200	190	170	215
2 3/4	330	135	290	160	245	170
3	390	110	340	125	290	145
3 1/2	520	95	450	110	380	120
4	700	80	620	95	535	105
4 1/2	890	65	775	75	665	85
5	1110	40	1015	45	920	55

SELECTION TABLE

Description	Outfit No.	Approx. Shpg. Wt. Lbs.	List Price
8' Eclipse Windmill	*8262A	380	\$64.75
10' Eclipse Windmill	*8263A	500	\$86.50

*Mills are complete with wheel, 3 lengths wood rod and couplings, pumpslide, windlass, bed plate and splice plates with bolts.

ACCESSORIES

Description	Approx. Shpg. Wt. Lbs.	List Price
3 Lengths Wood Pump Rod and Couplings	17	\$ 1.40
Pump Slide	3	.50
Splice Plates	8	.55
Windlass Complete	7	.80

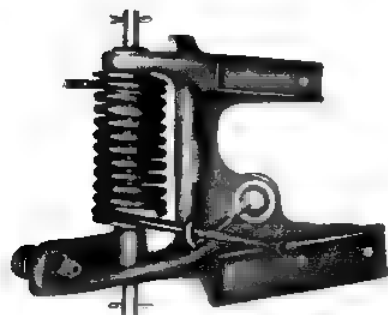


Here is a typical installation of an F-M Eclipse 10 foot windmill. The mill furnishes water under pressure for a 240 acre stock farm, two large service stations, and the residence.

This windmill pressure system has been made possible by the installation of a large storage tank in the

attic of the service station pictured on the left. From here the water flows, under pressure to the other service station and to all parts of the farm and farm home. This type of installation provides water under pressure wherever needed and is economical to install.

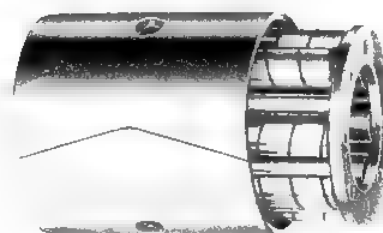
F-M ECLIPSE WINDMILLS ARE EASY TO MAINTAIN



The speed of the mill is automatically regulated by a spring governor so that the correct wind wheel speed and number of piston

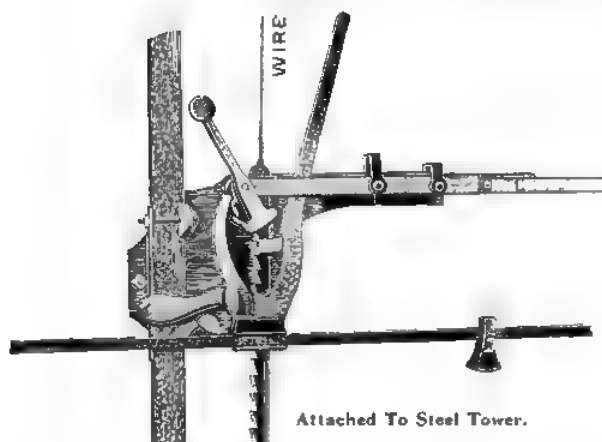
strokes per minute are maintained. Governing Action starts when the wind exceeds 18 M.P.H. and when the mill reaches a dangerous velocity — 25 miles an hour or more — the mill is swung completely "out of gear."

The circulatory system of the Eclipse mills entirely eliminates oil leakage and returns all of the lubricant to the oil reservoir where it need be replenished only once a year. All that is needed to do is remove the $\frac{3}{4}$ " return drain in the bottom of the oil reservoir until all of the oil is drained out, then replace the plug and fill the oil tract up to the level indicated on the housing.



Hyatt roller bearings of extra large size are used on the wheel shaft in such a manner that load is equally divided on all bearings. This permits the wheel to turn in the slightest breeze.

FAIRBANKS-MORSE WINDMILL REGULATOR



Attached To Steel Tower.

FOR AUTOMATIC STARTING
FOR AUTOMATIC STOPPING

Where the windmill is to be located down in the pasture away from the farm, a windmill regulator should be used. This makes the starting and stopping of the windmill completely automatic. Think what a saving of time and labor this will mean. It is attached to a float in the stock tank on the outside of the tower. It can be placed at any height on the tower and is easily attached and adjusted. When it leaves the factory it is ready to be attached to any steel tower only requiring two pieces of plank 2" x 12" x 2' long for the float. This regulator insures the use of the mill 24 hrs. a day instead of about 10 hours without it, and takes complete charge of the mill night and day.

List Price — \$8.75.

1942

Galvanized Four-Post Steel Towers For Eclipse Windmills---

Sturdily Constructed---Cross Girts Every Five Feet---Available in Ten Foot Sections

The Fairbanks-Morse towers for use with the Eclipse windmill have been designed with the strength and durability necessary to withstand the severe strains of windmill service. All of the towers have four corner-posts with girts 5 ft. apart.

The F-M tower is made in 10 foot sections in heights of from 20 ft. to 60 ft. The tower is available in different models. The No. 1 tower is satisfactory for use with the 8 ft. windmill. The No. 2 tower is of heavier construction, designed for use with the 10 ft. mill but it can also be used with the 8 ft. mill where a heavier tower is desired.

All of the F-M towers are designed so that they may be erected in place, one section at a time, or erected on the ground and raised into place by means of a gin pole after the tower and mill are assembled.

Corner Posts: The corner posts are made of heavy angle steel, galvanized, capable of withstanding severe strains. The posts are securely bolted together at the top through the medium of four heavy steel plates which permit of an even distribution of the windmill weight on each of the four corner posts.

Cross Girts: Of galvanized angle steel, placed at 5 ft. intervals throughout the entire height of the tower. The first girt is placed close to the ground, thus eliminating the weakness that is found in many makes of towers. The closeness of the girts also gives better support to the side ladder of the tower.

Pump Pole Guides: At intervals of 10 ft. in the tower, two steel guide rods are placed with bearing points at both ends. These prevent buckling of the pump pole, making it possible for the latter to take full, even pumping strokes.

Braces: Each ten foot section is further braced by eight twisted heavy galvanized steel wire braces, the loop ends of which fit over the long girt-to-posts bolts. Tension adjusting clips and bolts are provided for attachment to the braces where they cross the horizontal bracing. Tension on the braces can be easily changed simply by moving the clips.

Ladder and Platform: The ladder is made of angle iron with formed steel steps riveted thereon. A platform with an angle iron steel frame

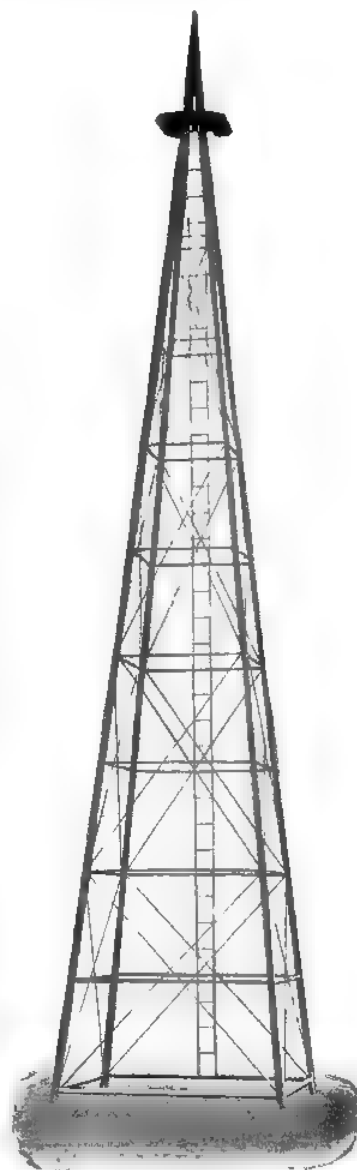
and banded wood top is securely bolted to the corner posts.

Anchor Posts:

The anchor posts, made in three parts, consist of a heavy galvanized angle five feet long which in service is bolted to two heavy angles forming a plate at the bottom of anchor, the entire assembly being galvanized to prevent rust. Anchor posts are shipped in two parts for compactness.

Use A High Tower

The sole purpose of the tower is to get the wind wheel up away from eddying ground currents, where it will receive a steady wind. It is important therefore to use a tower of ample height. The center of the wind wheel should be at least 15 ft. above any wind obstruction within 400 ft. of the tower. A windmill on a high tower will run in a lighter breeze. Where the tower is already installed, the Fairbanks-Morse Model 40 windmill, if so specified on the order, will be fitted with a special collar to adapt it to any prominent make of tower. If the tower is of wood, the universal collar and step regularly furnished with the mill can be fitted to the wood tower.



Anchor Post for Model F-M Tower.

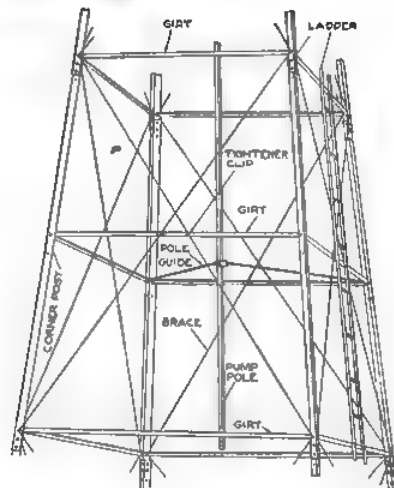
TOWER SPECIFICATIONS

	No. 1	No. 2	No. 3
SIZE ANGLES:			
Up to 40' in height.....	2" x 2" x 1/4"	2 1/4" x 2 1/4" x 1/4"	2 1/4" x 2 1/4" x 1/4"
Bottom 10' of 50' Towers	2 1/4" x 2 1/4" x 1/4"	3" x 3" x 1/4"	2 1/4" x 2 1/4" x 1/4"
Bottom 20' of 60' Towers	2 1/4" x 2 1/4" x 1/4"	3" x 3" x 1/4"	2 1/4" x 2 1/4" x 1/4"
ANCHOR PLATES:			
Up to 40' in height. ...	10"x10"x3/8"	10"x10"x3/8"	10"x10"x3/8"
Over 40' in height . . .	12"x12"x3/8"	12"x12"x3/8"	12"x12"x3/8"

1942

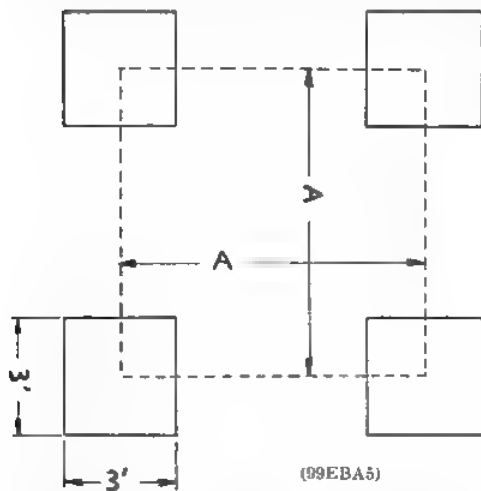
TO FARMERS
WITHOUT
PRIORITY

TO OTHERS
WITH PRIORITY



Typical 10 ft. section of tower showing braces, pump pole guide, tightener clips, etc., for towers assembled on the ground and raised into place.

ANCHOR POST HOLE DIMENSIONS



Height of Tower	(A) Girts above Splice	(A) Girts below Splice
10 ft.	27 1/4"	25 3/4"
20 ft.	50 3/4"	49"
30 ft.	74"	72 1/4"
40 ft.	97"	95 1/4"
50 ft.	119 3/4"	118"
60 ft.	142 1/4"	140 1/4"

These above dimensions are for the top end of anchor posts, not the lower end in concrete. The spread at the lower end would be approximately 11 1/4" wider. Four holes each about 4'-6" deep are necessary to anchor the Nos. 1, 2 and 3 towers.

Ease of Erection: The towers may be assembled "on the ground" and raised into place by means of a shear or gin pole or they may be built "in place" from the ground up, section by section. All corner posts are punched to permit of either method of erection.

When erected "in place" the cross girts are placed *below* the splice throughout the entire length of the tower. When erected "on the ground" the cross girts are placed *above* the splice.

MOUNTING OF STEEL ECLIPSE MILLS ON TOWERS OF OTHER MAKE:

When it is desired to mount the 6, 8 and 10 ft. Eclipse mill on a tower of another manufacture, the necessary adapters can be furnished with the mill, provided the make of tower is specified on the order. For adaption of the 8 and 10 ft. mills the extra charge for the necessary adapters will be as follows: (Always specify make of tower and number of posts.

4 POST TOWERS	ECLIPSE MILLS 8 10 ft. Sizes LIST PRICE
F-M Model "E"	\$1.50
F-M Model "F"	1.50
Plint and Walling or Star	2.75
Stover	2.75
Samson	2.75
Dandy	2.75
Dempster	2.75
I. X. L.	2.75
Woodmanse	2.00
Aermotor—Stub Tower	5.40
Challenge	2.75
Butler	2.75
Baker	2.75
May	2.75
Freeman	2.75
Stub for Wood Tower, 6 and 8 ft.	6.40
Stub for Wood Tower, 10 ft.	6.00

3 POST TOWERS	
Aermotor—Stub Tower	\$5.40
Appleton Stub Tower	5.40
Woodmanse	2.00

EXTRA LENGTHS WOOD PUMP POLE

If pump pole beyond the 36 ft. regularly furnished with the mill is required, there will be an extra charge as follows.

Size Pole	Length Feet	USED WITH	Price Per Length	Price, Splice Plates, Pair
1 3/4" x 1 1/4"	12	8 and 10 Ft. Mills...	\$1.40	\$1.05

4-POST GALVANIZED STEEL TOWERS (Cross Girts Every 5 Feet)

FOR ECLIPSE WINDMILLS

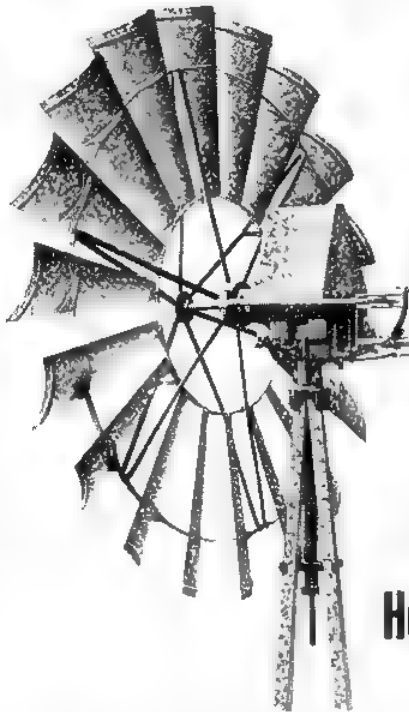
All Towers are hot galvanized after fabrication. Towers are complete with anchor posts, braces, platform, ladder and cross girts at 5 ft. intervals throughout height of the Tower. Prices on 50 ft. and 60 ft. Towers include the extra Pump Pole, Pump Pole Couplings, and Pullout Wire for the 5th and 6th sections.

Mill	Tower Symbol	Outfit No.	Height Ft.	Approx. Ship. Wt.	List Price
For 8 ft. Mill	No. 1-W	5221A	20	310	\$ 39 00
		5222A	30	475	58 75
		5223A	40	650	79 50
		5224A	50	875	106 00
		5225A	60	1155	114 50
For 10 ft. Mills	No. 2-W	5226A	20	360	45 25
		5227A	30	525	64 75
		5228A	40	725	88 75
		5229A	50	1025	124 50
		5230A	60	1325	160 50
	No. 3-W	5233A	20	390	49 50
		5234A	30	560	69 00
		5235A	40	775	95 50
		5236A	50	1100	135 00
		5237A	60	1350	172 50

STUB TOWERS

Outfit No.	Height, Ft.	DESCRIPTION	Code Word	Approx. Shipping Weight, Lbs.	Sales Price F.O.B. Factory
5248	4	For 8 Ft. Mills	VLOPA	40	\$6 00
5249	5	For 10 Ft. Mills	VLORC	50	6 80
5315		Angle Feet (Set of 4)	VLOGG		65

1942



"FAIRBURY" SUPER-OILED WINDMILL

OIL ONCE A YEAR



All parts running in a bath of oil

Helical Cut Steel Pinions and Semi Steel Gears.

Gears like the timing gears in a car, no back lash. One tooth never lets go till the next one takes a hold. A Windmill that will give SERVICE and requires attention but once a year, to renew the oil—Priced right.

Write for special agency proposition.

FAIRBURY WINDMILL CO., Fairbury, Neb.

1924

Flint & Walling Mfg. Co.

530 Oak Street, Kendallville, Ind.

"STAR" WIND MILLS



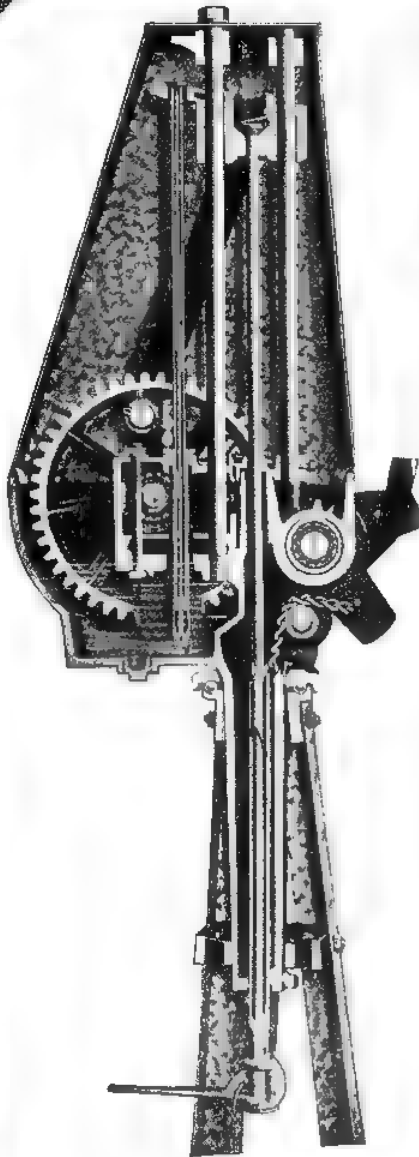
Designed particularly for the service of supplying large quantities of water under all the variable conditions of the wind.

Galvanized Steel or Wood

All sizes, 4 to 26 ft. in diameter
WITH BALL BEARINGS

1903

1924



Excels in Light Winds

All shafts, bearings, and guides of the Model 24 Star Windmill are effectively and positively oiled.

This illustration of the Model 24 Star, showing engine cut in half, shows the simplicity of the Star and its lubricating system. At each revolution of the crank shaft, a simple plunger oil pump is operated, delivering oil to the top of crosshead, from which point it flows to lubricate the guide rods, upper pitman bearings and drive shaft bearings. The large gears dip in oil, providing lubrication for lower pitman bearings and crank shaft.

The Model 24 Star may be had with either Timken Tapered Roller or our own NO-OIL-EM Bearings. One filling of crank case each year provides ideal lubrication, enabling the Star to excel in pumping water in light winds.

May be had in 7, 8, 10 and 12 foot sizes.

Complete description, prices and name of your nearest distributor on request.

**Flint & Walling
Manufacturing Co.**

Kendallville, Indiana

Running - in - oil STAR WINDMILLS

FREE ELECTRICITY

From the Wind

Light Your House, Barn, All Power You Need **FREE**

A Wind Power Light Plant will light your house and furnish power free, from the wind. Generates electricity even in light breeze. Costs nothing to run. Trouble-free, guaranteed by company of international reputation, the leader in its field. Enjoy free light and power on YOUR farm. Be done with repair and upkeep costs. Mail coupon for free literature. **WIND-POWER LIGHT CO., Newton, Iowa**

*****Mail This Coupon*****

Wind-Power Light Co., Box H, Newton, Ia.

Please send Free illustrated literature without obligation.

Name.....

Address.....

1935

ELECTRIFY WITH NATIONAL A UNIT FOR EVERY PURSE

Complete line of wind power units, engine generators, batteries.

National Air-Zephyr. Automatic wind power unit, protected against storms, will last a lifetime. 1,250 watts to 5,000 watts, in 32 and 110 volts.

National Engine Generators. Rugged oversize design in six and 32 volts—six models ranging from 150 to 1,500 watts.

National Farmlight Batteries. Backed by 15 years experience. 8 sizes from 110 ampere hours to 420 ampere hours.

See your National dealer or write to the National Battery Co., Dept. F-9, 1728 Roblyn Ave., St. Paul, Minn.

NATIONAL BATTERY CO.

1936

*Pumping Efficiency Increased
Wherever This New
Star Is Used*

1927

**The New
Star**

May be had in
sizes from 5 to
15 feet

A Lifetime Servant of Steel



The Improved
FREEMAN
windmill is a servant
of steel that will serve
you for your lifetime. It
develops great power, be-
ing equipped with famous
Hyatt roller bearings and
bronze graphite bearings.
Runs noiselessly and
smoothly in any wind. The
dependable farm servant
that costs nothing for fuel.

Self-Lubricating Needs No Care

For 365 days you pay
no attention to it, then you
oil it and forget about it
again for another year.
For convenience and real
power service, you will want
the **FREEMAN**. A size to
meet your need; towers,
too. See your dealer or
write us for free catalog
No. 200-B

1923

FREEMAN MFG. CO.
RACINE WISCONSIN

SELF-OILING Double-Geared



Oil Once a Year
This new
Freeman Steel
Windmill is the
last word in a
long-wearing,
light-running,
trouble-free mill.
The entire
working part of the engine head
is enclosed in dust-proof housing
and runs in oil.

Extra - Heavy, Long - Wearing Mill

The double gears, pinions and other main parts
are considerably heavier than in other mills of
similar type. It will run in a lighter wind, for
more years, and with less attention. Backed by
our 50 year windmill experience. Write for litera-
ture, sizes and prices on this new, better mill,
and Freeman Angle Steel Towers.

Gears
Run in
OIL

FREEMAN MFG. CO.
Dept. 200W Racine, Wis.

1927

GET A GOOD WIND MILL



Don't buy a poor wind mill. Don't
pay a double price. Send direct to
our factory for catalogue of the

Freeman Steel Wind Mills

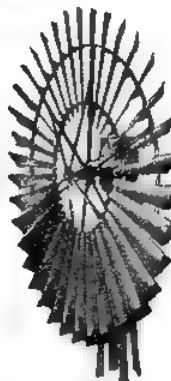
and four post angle steel towers. A
complete line of pumping and power
mills of the highest grade at extreme-
ly low prices. We can save you
money on a good article.

S. Freeman & Sons Mfg. Co.,
107 Hamilton St., Racine, Wis.

A complete line of Feed and Ensilage Cutters,
Corn Shellers, Wood Saws, etc., at low prices.

1903

BAKER SELF OILING WINDMILL



The Finest Windmill in the Wind

Requires only one oil-
ing a year. The most
economical water
pumping machine in
the world.

The most sails to the wheel. Stiff
and sturdy to withstand severest
storms.

Working Parts Run In Oil

Noiseless and Easy-Running

Can be easily placed on
other make Towers. Will
pump the most water at
least cost.

The Heller-Aller Co.,
Napoleon, Ohio

*For
40 Years
We Have Built
Wind
Mills*

1926

BAKER RUN-IN OIL WIND MILL



FOR MORE
THAN
40 YEARS

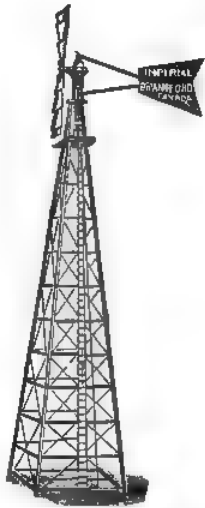
**Best for the Price
Always on the Job
Known the World Over
Excellent in Quality
Run-In-Oil**

Distributors

The Chandler Pump & Supply Co., Kansas City, Mo.
The Chamberlin Supply Co., Oklahoma City, Okla.

THE HELLER-ALLER CO.
NAPOLION, OHIO

1927



BEST

BY FAR IN

Wind Power

is the "Imperial" wind engine made at Brantford, Ont., by Goold, Shapley & Muir Ltd. Under the most severe test in competition with other makes, this Wind Mill has never failed to come out top dog.

Made throughout of best quality material, and every unit is thoroughly tested and guaranteed before leaving the works.

Write for Catalogue and details of the FUEL SAVING of the IDEAL.

Factory : Brantford

Goold Shapley & Muir Co., Ltd.

230 Princess St., Winnipeg

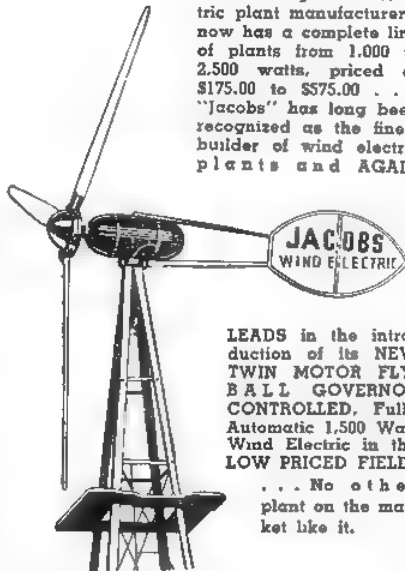
1910

Proof against any Wind Storm that will not move a town from its foundations . . .

JACOBS ANNOUNCES

A New Line of Farm Electric Plants for 1938

The "Jacobs Company," one of America's oldest and leading wind electric plant manufacturers, now has a complete line of plants from 1,000 to 2,500 watts, priced at \$175.00 to \$575.00 . . . "Jacobs" has long been recognized as the finest builder of wind electric plants and AGAIN



LEADS in the introduction of its NEW TWIN MOTOR FLY-BALL GOVERNOR CONTROLLED, Fully Automatic 1,500 Watt Wind Electric in the LOW PRICED FIELD.

. . . No other plant on the market like it.

(Jacobs Wind Electric Plants Have Been Imitated. But Never Equalled.)

Your territory may still be available. Write today for details

THE JACOBS WIND ELECTRIC CO., Inc.
MINNEAPOLIS, MINN.

1937

Electricity From The Wind!

At LOWEST COST

No Fuel to Buy - No Engine Required
For Electric Lights -
Power - Water, Etc.



1927

Now Every Farm Home can have electricity at a cost so amazingly low that you cannot afford to be without this wonderful convenience. HEBCO Wind Electric produces light, power and water at the cost of pumping water with a windmill.

A HEBCO Wind Electric plant will furnish all the electric power necessary to light your home and barns—run your separator, churn, milker, washing machine, vacuum cleaner, electric iron, fan, sewing machine, pump, small feed grinder, etc., at a much lower cost than engine light plants or "high-line" central station current.

Takes Only 8-Mile Wind to Make Electricity

The HEBCO weather-proof electric generator is mounted on top of the tower and is driven by a scientifically built aeroplane propeller which produces power in less wind than any wind mill. It develops power in an 8-mile air movement, which means that your lamps, iron, etc., will take their current directly from the generator most of the time, with the surplus going to the storage batteries for further use.

Will Last a Lifetime—Requires Little Attention

No fuel to buy—no engine to start or fuss with—no noise or fire hazard in the house—the HEBCO is the silent, automatic servant that requires practically no attention. Oiling twice a year and an occasional inspection is all that is necessary. Batteries last from 4 to 6 years longer than in engine driven plants. Clear charging does it.

Every plant fully guaranteed. Many in use and giving wonderful satisfactory service. Uncle Sam uses HEBCO plants to light the air mail highways. The power of a propeller "flew" Lindbergh to Paris; and only such a propeller can give you maximum, enduring service on your farm. We also make a non-electric water pumper of capacity equal to an 18 ft. wheel without its destructibility in hurricanes.

Write today for FREE folder which tells all about the HEBCO and why it is the Best and Cheapest electric plant you can buy. Ask for location of the HEBCO nearest to you.

HERBERT E. BUCKLEN CORPORATION
Dept. 11—ELKHART, INDIANA, U. S. A.

Let the Wind Which Is Free Help Furnish Your Power

Wanted DEALERS and DISTRIBUTORS

We have territory open to right kind of dealers. The HEBCO offers an exceptional opportunity for sales as it is easy to demonstrate the economy of this lighting plant, and of the pumper over all others. Our advertising campaign will help you. Write today for full particulars.

W-I-N-D
is the only
Free Power on the Farm



Let it generate electricity for you.

A SUPER-AUTOMATIC JACOBS WIND ELECTRIC installed on your farm will supply ample electricity for all lights, motors and appliances. Its patented flyball governor, automatic charging control, voltage control, direct drive slow speed generator, seven years of perfect performance, quiet operation, simplicity and freedom from attention and an unconditional long time guarantee, are some of the reasons why **THE JACOBS IS THE WORLD'S LEADING FARM LIGHTING PLANT.**

Write for a circular before you invest in any electric system.

THE JACOBS WIND ELECTRIC CO., Inc.
2111 Washington Ave. No.
MINNEAPOLIS, MINN.

1935

**JACOBS BUILT
1,000 WATT
Electric Wind Plant
\$285.00**

Here's really BIG News. Yes—A "Jacobs Built" fully guaranteed Electric Wind Plant ready for the farm trade after many months of testing under all conditions . . . Modernize and electrify your home. Have ample electricity at all times for lights, motors and appliances. "Jacobs" has a reputation of over eight years of perfect performance. NEVER A BURNED OUT GENERATOR. Admiral Byrd used a "Jacobs" at the South Pole. Largest generator, slower operating speeds. Other "Jacobs" electric wind power plants—1,250 watts, 1,500-2000 watt, built and guaranteed by "Jacobs," one of the oldest Wind Electric Companies in America, with plants operating in many parts of the world . . . An interesting folder is yours FREE. Also name of nearest "Jacobs" dealer. Write today, it will pay.

The Jacobs Wind Electric Co., Inc.
2111 Washington Ave. No.
Minneapolis, Minn.



1936

SAVE MONEY

The Manvel Direct Stroke Windmill still leads after more than sixty years' dependable service. Thousands of them have run thirty years without upkeep expense.

The Manvel Fits Any Tower
Working parts encased; adjustable direct stroke; broad ball-bearing turntable. All made in our own factory—hence low price, high quality. The Manvel saves you money. Write for free book describing our wood and steel mills, towers, tanks, etc.

Kalamazoo Tank & Silo Co., Dept. 733 Kalamazoo, Mich.



1924

A GOOD WIND MILL.
Lasts a life time.
Don't buy a poor one when you can buy the
IMPERIAL
with patent internal gear and malleable iron frame. Write for full information and catalog.
Mast, Foss & Co.
18 River St. Springfield, Ohio.



1900

LEACH
Windmill Goods
8 to 20 foot wheels
We do strictly a mail order business. For prices and description address: **The Leach Windmill & Tank Co. Joliet, Ill., U.S.A. Office & Factory Center & Monro.**





1908

READ \$12 THIS SPECIAL OFFER!

**NEW 1938
PHILCO
FARM RADIO**

NOW—own the finest farm radio of them all—the new 1938 PHILCO with Super 6-volt Battery *plus* the great PHILCO SKY-CHARGER that gives you power for both radio and a number of electric lights at a \$12 saving on the Sky-Charger cost!

Never before such an offer! Radio entertainment at an operating cost of less than 1 cent a week . . . *plus* Free Demonstration, Liberal Allowance for your old radio or any musical instrument, and Easy Terms. Hurry . . . send coupon for FREE \$12 Credit Check! Mail in envelope or paste on penny postcard.

PHILCO 39K
For 6-volt operation. American and Foreign reception. Push Pull Audio System. Concert Grand Dynamic Speaker. Philco Color Dial, 3 Point Tune Control and many other big features. Gorgeous cabinet. Tremendous \$69.95 value! Less battery . . .

PHILCO FARM RADIOS
\$29.95 UP
Electric Sets—\$22.50 up
Prices Slightly Higher
Denver and West



**NEW PHILCO
10-FOOT
SKY-CHARGER**

Made by
Parris-Dunn
Corp.

**IT'S
SENSATIONAL**



MAIL THIS COUPON TODAY!

Philco Radio and Television Corporation, CG-1
Beury Bldg., 3701 N. Broad St., Philadelphia, Pa.

Please send, without cost to me, the \$12 Credit Check with full details of Special Offer—plus new, beautifully-illustrated PHILCO folder.

Name _____

Address or R. F. D. _____

Town _____ State _____

1910



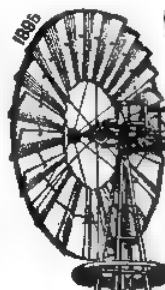
The Light Running Canadian Airmotor has led the procession for 16 years. Get one to water your stock this season. It will save you time, money and strength.

A Good Pump on the farm is a "joy forever". Our line of Toronto Wood, Iron and Galvanized Gusher Pumps, single and double acting. Also our Aylmer

Line of Double and Single acting pumps, give you the greatest variety to select from. Are sold by the Implement and Hardware trade every where.

Aylmer Standard Scales all Styles are the standard of Excellence. The Farmers Wagon & Stock Scale, Cap. 2000 lbs. with 3 point bearing will save you its price in one year and last you a life time. Write for our Booklet on scales, pumps and windmills.

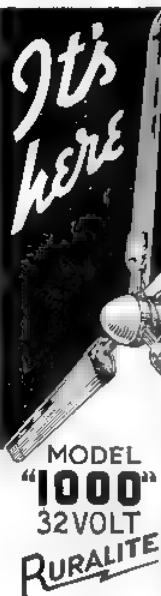
ONTARIO WIND ENGINE & PUMP COMPANY, LTD.
WINNIPEG TORONTO CALGARY



1895
THE RELIABLE

PERKINS Steel, Galvanized, Power and Pumping Mills.

With Graphite Boxes. Galvanized Steel Towers. Warrant covers to fullest extent. Before buying get catalogue and prices of what we manufacture.
PERKINS WIND MILL CO.,
6 Race St., Mishawaka, Ind.



RURALITE

**LEADERSHIP IN
DEALER PROFIT
QUICK TURNOVER**



**FINER
QUALITY**

EXCLUSIVE TERRITORY

MODEL
"1000"
32VOLT
RURALITE

Wherever there's a windmill, you'll find a prospect for Ruralite.

You will search in vain for a more efficient and more economical 32-40-volt wind electric plant than the Ruralite Model "1000". No charger at any price performs so nicely and operates so economically.

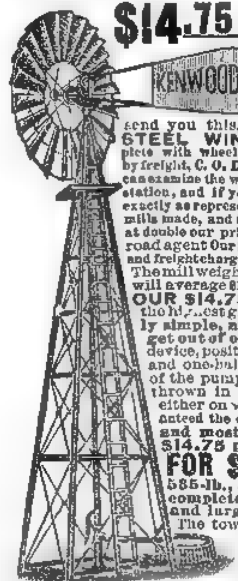
You naturally want to sell Quality Merchandise with genuine pride, so you'll want to sell Ruralite. The only 1000-watt charger that gives you the height of quality and all the new worth-while wind-electric advancements with the added advantage of low price.

Write for exclusive territory franchise Today—tomorrow may be too late.

Write

RURALITE ENGINEERING COMPANY, Sioux City, Iowa,
for literature and information on 32-volt and 6-volt Ruralite chargers.
1937

1901



\$14.75 STEEL MILL, SEND NO MONEY

if you live within 500 miles of Chicago, (if further, send \$1.00), cut this ad out and send to us, and we will send you this **THE BEST 8-FOOT STEEL WINDMILL MADE**, complete with wheel, tank, chain, wire and rod, by freight, C. O. D., subject to examination. You can examine the windmill at your nearest railroad station, and if you find it perfectly satisfactory, exactly as represented, one of the best steel windmills made, and the equal of mills sold by others at double our price, pay the railroad agent our Special Offer Price **\$14.75** and freight charges (less \$1.00 if sent with order). The mill weighs 535 pounds, and the freight will average \$1.50 to \$2.00 for each 500 miles.

OUR \$14.75 WINDMILL is one of the best grade mills made. Extremely simple, made of few parts, cannot get out of order. Automatic self-oiling device, positive brake, wheel makes two and one-half revolutions to one stroke of the pump, responds instantly when thrown in or out of gear, can be used either on wood or steel tower. Guaranteed the easiest running, best, strongest and most durable mill made.

FOR \$14.95 we furnish the 585-lb., 80 foot, all steel tower, complete with anchor posts, and large platform. The tower is strongly braced with angle steel cross-arms from post to post on every side and on the bottom, the best tower construction possible.

Sent anywhere within 500 miles of Chicago without deposit, our special price **\$14.95** and freight charges payable when received and found satisfactory. At **\$14.95** we furnish tower painted; if galvanized, **\$16.30**. Complete steel mill and 30-foot steel tower painted, **\$25.70**; complete tower and mill, galvanized, **\$32.20**. For 20-foot steel tower in place of 30-foot, deduct **\$3.00**.

30 DAYS' FREE TRIAL. After you pay the railroad agent our special price, you can give this mill 30 days' trial on your own place, and if it does not prove satisfactory in every way, return it to us at our expense of freight charges, and we will return your money.

ONE YEAR GUARANTEE. Every mill and tower is put out under our written, binding one-year guarantee. With care it will last a lifetime. **PRICES MAY GO UP.** Steel is advancing at the mills, a permanent advance in steel will advance the price of mills and towers and we therefore advise you to order at once. **ORDER TODAY.** Address **SEARS, ROEBUCK & CO., CHICAGO, ILL.**



The Manitoba Windmill & Pump Co., Ltd.

BOX 301

BRANDON, MAN.


1910

\$12.95 WINDMILL.

 For \$12.95 we furnish the highest grade galvanized steel pumping windmill made. For \$25.00 we furnish the same windmill complete with the highest grade GALVANIZED ANGLE STEEL FOUR-POST TOWER made. For lowest prices ever, known on all sizes of windmills, towers, tanks and tank heaters, and most liberal windmill offer ever made, write for FREE WINDMILL CATALOGUE. Address, SEARS, ROEBUCK & CO., CHICAGO.

1902
\$15.05 STEEL MILL

 For \$15.05 we sell the HIGHEST GRADE, STRONGEST, LIGHTEST RUNNING AND BEST PUMPING STEEL WINDMILL. **\$14.30** the highest grade and strongest all steel windmill TOWER. Every mill covered by a BINDING GUARANTEE. FOR GREATEST WINDMILL OFFER EVER MADE, cut this ad. out and mail to SEARS, ROEBUCK & CO., CHICAGO, ILL.

1937
Build Your Own

Wind Light Plant from auto generator. We show you how. Make money building for others. Light your buildings, play radio, operate washing machine and other motors. Dime brings complete plans and 1937 catalog. Over 50 other changes for 6-12-32 and 110 volt plants. Satisfaction guaranteed. LEJAY MFG. CO., 1411 W. Lake, Minneapolis, Minn.

Years of Satisfaction
ANDREW ALL-IN-OIL WINDMILL.

Most Economical—No device can pump water as economically as a windmill is more generally recognized than ever. **Easiest running model** All principal working parts continually flooded in oil. Operates in the lightest breeze. Timken Roller Bearings. Easy to operate—A child can run it—safely. Can be left in operation—automatically governed. Satisfied customers for years have told us the Andrew is the Best Windmill model! **ITS SAVINGS WILL PAY FOR IT!** See your dealer or write Mr. Andrew of the DUPLEX MANUFACTURING CO. Est. 1882 Superior, Wisconsin

1931
SAMSON WINDMILLS

The only Windmills in the world built on correct mechanical lines.
Double-Gear Center-Lift Principle which eliminates the side-racking strain and friction, doubles the life of the mill and enables it to pump more water in lighter winds than any other mill made. Write today for beautifully illustrated catalog.
STOVER MFG. CO.
 30 Samson Ave., FREEPORT, ILL.
1910

The Samson

1903

The Only Double-Gear Mill, Frictionless, Noiseless, Perfect as a Watch, and Works In Any Wind

Every man who is about to install a new windmill, or replace an old one, should familiarize himself with the workings of the **Samson Double-Gear Windmill**. Its actual work all over the world demonstrates that it does four times the work of all old style machines, and lasts twice as long. It works perfectly in the heaviest wind, or under the gentle pressure of the summer zephyr. Try to ride a bicycle up-hill, using only one pedal to propel it. You are doing the work of the old single-gear mill. It's a strain on you, and on the machine. It's slow work. Now try the same hill, using both pedals, and you will understand the principle of the **Samson Double-Gear Mill**, and why it is the most reliable and economical mill made.

WHAT THE DOUBLE-GEAR IS

This feature alone places the **Samson** in a class by itself. It consists of two (2) gearings engaging each other, making two (2) trains to transmit power to the pump. The entire mechanism is ingeniously simple, giving the least resistance or friction and precluding the danger of strain on any part. The gear case has four (4) bearings or points of contact, giving great rigidity and strength to the operating parts. The weight of the wheel is borne squarely by a long bearing within its own hub. Every part is specially contrived to withstand sudden and violent storms, to distribute weight, and minimize wear. The tower, sails and vane are constructed of rust-proof galvanized steel.

We Guarantee the Samson Windmill

To be made of good material, and to be stronger, more perfectly self regulating than any other. Its name indicates its strength. Read this over again, then send for our **free booklet**. We have a book that tells about windmills—shows pictures of them in every country, and tells all that is worth knowing about them. It will interest you, and show you the differences. You will know the right kind from the wrong kind. **It is free.** Just write for it, and don't buy until you see it.

THE STOVER MANUFACTURING CO., Box 1, Freeport, Ill.



PUMP AND SPLASH
OILING



SELF-ALIGNING RUN-IN OIL BRONZE AND GRAPHITE TURNTABLE



THE ORIGINAL DOUBLE GEARED WINDMILL

The New STOVER-SAMSON
A Lifetime Windmill GUARANTEED BY Stover Mfg. & Engine Co.

SAMSON

Every part has been improved and designed and built to last a lifetime. If the oil is renewed once a year, the working parts will continue to give dependable service for scores of years. This means that you not only can sell the Stover with confidence that it will give complete, lasting satisfaction but that you will not be troubled with costly "service" and replacement requests.



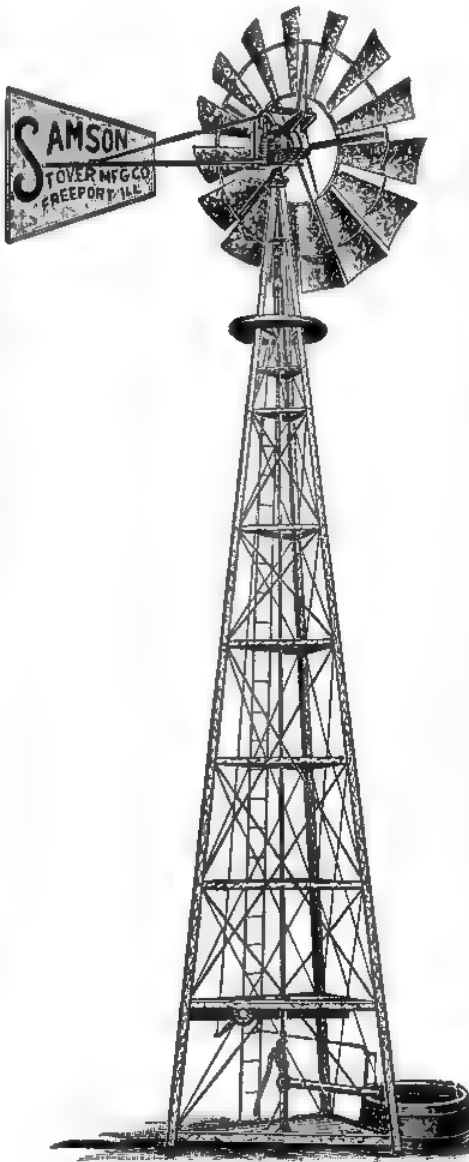
WRITE for FREE BOOK

STOVER MFG. & ENGINE COMPANY

Manufacturers of

Engines, Pump Jacks, Galvanized Towers, Limestone Pulverizers, Saw Frames, Drag Saws, Tank Heaters and Stock Waterers
 Feed Grinders, Corn Shellers.
FREEPORT, ILLINOIS, DEPT. FME

1935



The Samson

GALVANIZED STEEL
WIND MILL

The Strongest and Best Mill on Earth

It is a double-gearred mill and is the latest great advance in wind-mill construction.

The capacity of our new wind-mill factory is 75,000 mills a year—the greatest capacity of any factory of its kind on earth.

... THE SAMSON ...

is a double-gearred mill and is the latest great advance in wind-mill construction.

It will be readily seen that this double gear imparts double the strength to the Samson over that of any other mill of equal size. Since the gear is double and the strain of work is equally divided between the two gears, there is no side draft, shake or wobble to cut out the gears. The gearing, therefore, has four times the life and wearing qualities of any single gear.



SAMSON DOUBLE GEAR

All interested in irrigation should write us for our finely illustrated book on irrigation matters, which will be sent free to all who mention THE IRRIGATION AGE. This work contains all necessary information for establishing an irrigation plant by wind power.

Remember We Guarantee the Samson

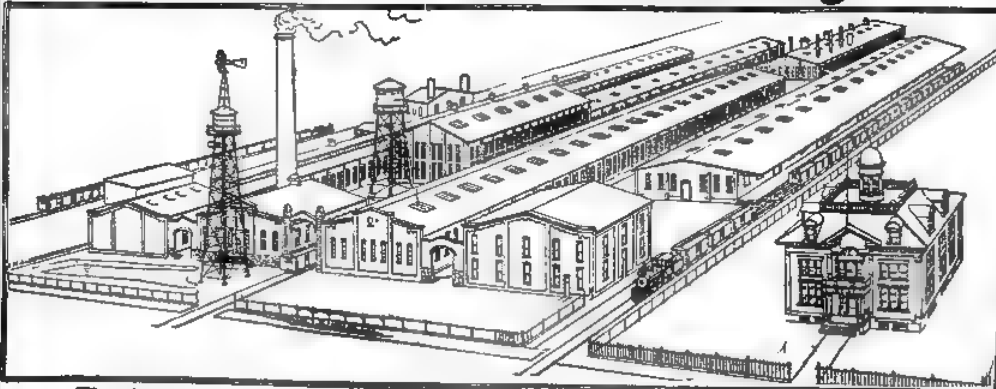
The Stover Manf'g Co.

617 River Street

FREEPORT, ILL.

Here Is Where We Make the **SAMSON.**

75,000 Wind Mills Annually.



That is the capacity of our new factories shown above. The old were unequal to the demand upon them. We had to build greater. The new plant is constructed so that skilled labor, science, conditions and appliances may conspire to make the perfect wind mill. It covers six and a half acres of ground. We believe it makes the best mill in the world.

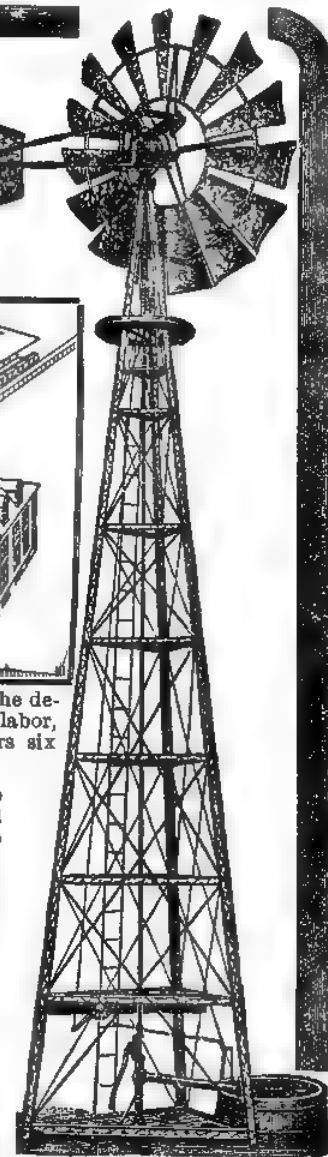
The Samson



is all that its name implies. Equally adapted to light work or deep water raising. You may call upon it for whatever power is required. The material is galvanized steel. The tower is lithe and graceful. Every part of the completed whole is equal to any test of strength that may by any possibility be put upon it. Like our factory, the Samson wind mill has grown with us. We confidently assert that in the Samson the nearest approach to perfection is to be found. We fully guarantee the Samson wind mills. Write for our free handsome illustrated catalogue.

The Stover Mfg. Co.,

529 River St., Freeport, Ills.



1891

35 YEARS
Experience



WIND MILLS

THE HALLADAY MILL is acknowledged the Standard Wind Mill of the World, and is made in 16 sizes, 8 to 60 ft. diameter, 1 man to 40 horse power. It is adapted to pumping water for Stock and Dairy Farms, Irrigation and Village Water Supply and Fire Protection, Railway Water Stations, Irrigation, Drainage, Etc.

THE HALLADAY is made upon honor and guaranteed The Most Powerful, Durable and Best Regulated Storm-Defying Wind Mill on the market.

U. S. SOLID WHEEL

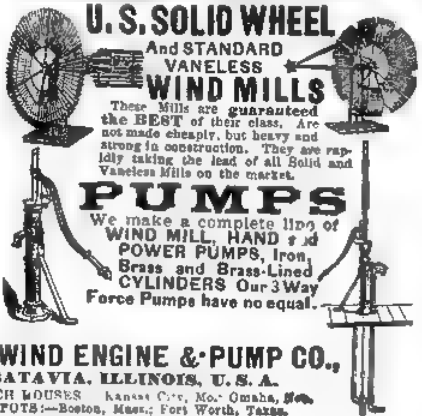
And STANDARD VANELESS

WIND MILLS

These Mills are guaranteed the BEST of their class. Are not made cheaply, but heavy and strong in construction. They are rapidly taking the lead of all Solid and Vaneless Mills on the market.

PUMPS

We make a complete line of WIND MILL, HAND and POWER PUMPS, Iron Brass and Brass-Lined CYLINDERS Our 3 Way Force Pumps have no equal.



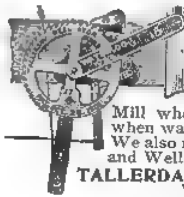
U. S. WIND ENGINE & PUMP CO.,

BATAVIA, ILLINOIS, U. S. A.

BRANCH HOUSES: Kansas City, Mo.; Omaha, Ne.
DEPOTS:—Boston, Mass.; Fort Worth, Texas.

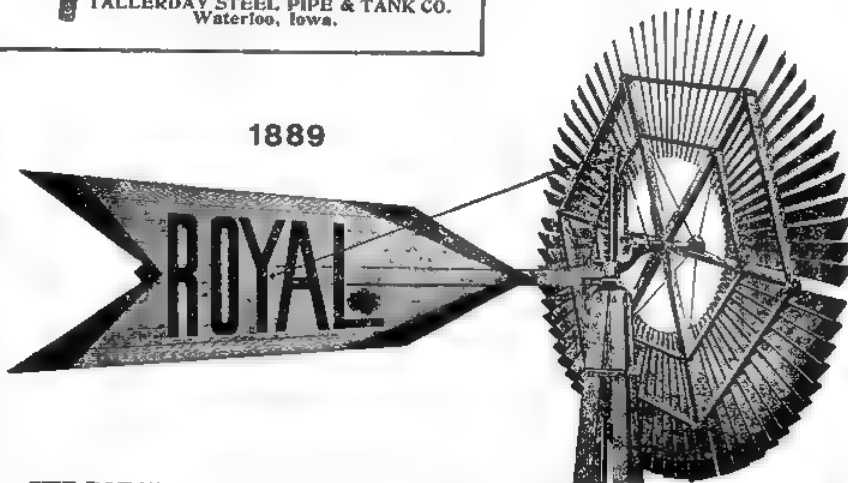
1902

No Mud Hole ABOUT YOUR TANKS



This Regulator **Stops** your Mill when Tanks are full. **Starts** it when water lowers. **It never forgets.** We also make Steel Tanks, Culvert Pipe and Well Casing. Write us. Address, TALLERDAY STEEL PIPE & TANK CO. Waterloo, Iowa.

1889



THE ROYAL WIND MILL, Manufactured by E. B. WINGER, Freeport, Illinois.

"BIG CITY" RADIO RECEPTION
Comes to the Farm!
LESS THAN 50c A YEAR
Power Operating Cost



RADIO LEADERS OF THE WORLD

1938



ALSO ADMIRAL, BELMONT, CLARION, FADA, FRESHMAN, GOODYEAR, PATTERSON, PILOT, STROMBERG-CARLSON AND MANY OTHERS

GENUINE RADIO

WINCHARGER

REG. U.S. PAT. OFF.

6-VOLT DeLUXE

FARM homes can now enjoy every advantage of "big-city" radio reception. Amazing new farm radios . . . equal to the finest city radios, but powered by FREE ELECTRICITY FROM THE WIND . . . have been developed by these Radio Leaders of the World. They offer an utterly new kind of farm radio enjoyment at an utterly new low operating cost.

These new 1938 farm radios are designed for use with the famous 6-Volt DeLuxe Wincharger, which turns FREE WIND POWER into electricity. Now you can have all the thrilling radio entertainment you want—for less than 50c a year power operating cost! No "B" batteries to buy. No expensive recharging. These radios operate from a single storage battery which

can be kept fully charged at all times with a Wincharger. You can run your radio as much as you want, and there's usually current to spare for three or four lights, fans, etc., in addition to radio.

More than 500,000 delighted listeners in all parts of the world now enjoy the benefits of Wincharger's FREE ELECTRICITY FROM THE WIND. You can, too! All you need to do is harness the wind that blows over your farm.

Go to any radio dealer today. Let him demonstrate these wonderful new farm radios, and show you the genuine Wincharger. He will tell you how you can get the regular \$25 DeLuxe Wincharger with your new radio for only \$17.50—a clear cash saving of \$7.50!

See Any Radio Dealer Today!

WINCHARGER CORPORATION, SIOUX CITY, IOWA
World's Largest Manufacturers of Wind-Electric Equipment

ANNOUNCE AMAZING NEW
6-VOLT RADIOS POWERED BY
Free Electricity from the Wind



BUILT TO LAST FOR YEARS!

Only the Genuine Wincharger Offers All These Long-Life Features:

6-Foot Albers Airfoil Propeller—gets all the power from the wind. Proved 20% to 50% more efficient in wind-tunnel tests. Copper banded and copper sheathed. . . . Automatic Dual-Purpose Governor—acts as fly-wheel in low or gusty winds; governs speed in high wind. . . . Double-Brush Collector Ring—makes perfect contact at all times. . . . Genuine Delco-Remy Generator—designed and built specially for Wincharger by the world's largest generator manufacturers. . . . Ball-Bearing Turntable—allows Wincharger to turn freely, always facing directly into the wind. . . . Auto-Type Brake—operates so easily that even a child can stop Wincharger in a high wind. . . . Rigid Tail Vane—keeps Wincharger headed into wind for maximum power output; no complicated tip-up devices; no swinging tail vanes. . . . Wincharger Instrument Panel and Wind-Electric Relay—tells amount of charge or discharge at any time.

Write for Information on Our

22 VOLT GIANT WINCHARGER

REG. U.S. PAT. OFF.

FARM POWER PLANT

Provides complete practical electrification for the farm. Ample capacity for dozens of lights in home, yard, and barn. . . . plenty of power for radio, water system, washer, and vacuum cleaner, as well as motors to make farm jobs easy. Offered at the world's lowest price—only \$15 down. Satisfaction Guaranteed or Your Money Back!

ONLY \$15 DOWN

MAIL COUPON TODAY

WINCHARGER CORPORATION
 Dept. CG 1037, Sioux City, Iowa
 Tell me how I can have ELECTRICITY on my farm for only 50c a year power operating cost!

Name
 P. O.
 COUNTY State

Have you a gas-operated plant?
 Save postage: Paste coupon on penny postal card.

FREE LIGHT POWER WATER WIND from the

Why put up with the inconvenience of kerosene or acetylene lights and hand-operated home appliances when you can have electricity—free.



The FRITCHLE Wind-Electric System



generates all the electric current you can use—and at no cost at all. Your windmill pumps your water—at the same time storing up electricity for your lighting system, separator, milking machine, vacuum cleaner and a hundred other uses.

No odor, no noise, no dirt. Silent and efficient. The Fritchle Wind-Electric System is not an experiment.

Dealers

A farm electric plant that also pumps water and operates without trouble or expense is indeed an attractive proposition. If we are not already represented in your territory write us today.

Scores of these outfits in constant use for years prove their practicability and long life.

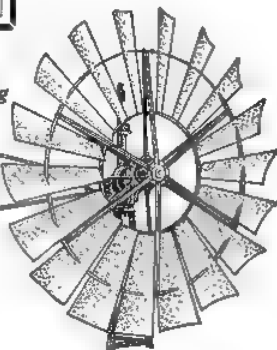
Woodmanse Oilless Windmills

Sturdily built of the best materials. Woodmanse mills will last longer with less attention and give greater satisfaction than any others. Backed by fifty years of dependable performance.

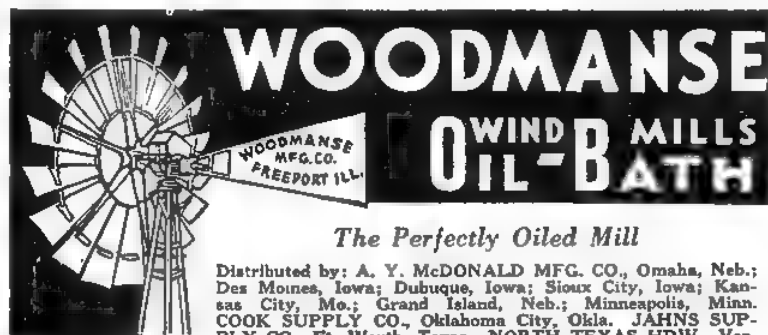
Run for years without oiling

WOODMANSE
MFG. CO.
FREEPORT, ILL.

Send for
FREE
Illustrated
Booklet



1923



The Perfectly Oiled Mill

Distributed by: A. Y. McDONALD MFG. CO., Omaha, Neb.; Des Moines, Iowa; Dubuque, Iowa; Sioux City, Iowa; Kansas City, Mo.; Grand Island, Neb.; Minneapolis, Minn. COOK SUPPLY CO., Oklahoma City, Okla. JAHNS SUPPLY CO., Ft. Worth, Texas. NORTH TEXAS HDW., Vernon, Texas. HODGES BROS., Lubbock, Texas.

Woodmanse Manufacturing Co.

Freeport, Illinois

1934

1935

HARNESS the WIND to YOUR L'TATRO BATTERY



At last the practical wind-charger! Metal Blades... Generates in moderate wind... Automatic speed control! Send name and address for complete information.
QUEEN STOVE WORKS
Box 88, Albert Lea, Minn.

1938

SAVE UP TO \$1550

ON A DELUXE MODEL ORIGINAL WINCHARGER through Savings Certificate given FREE to every purchaser of a Zenith Farm Radio.

FREPOWER From the Air

No more buying dry batteries or taking batteries to town for recharging.



CHILDREN, GROWN-UPS, FATHER, MOTHER, DAUGHTER and the HELP—Everybody enjoys a Zenith—entertainment—crops—markets—weather—planes—police—etc.



EUROPE, SOUTH AMERICA or the ORIENT guaranteed every day or your money back on all short wave Zeniths.

Zenith offers many models—all reasonably priced in Farm or City sets on easy terms.



ZENITH RADIO CORPORATION
6001 Dickens Avenue, Chicago

Without obligation, send me Wincharger Savings Certificate (FREE!); also send catalog.

- ☐ I have high-line power
☐ I don't have high-line power

Name.....

Address.....

City.....State.....

1-CH-8

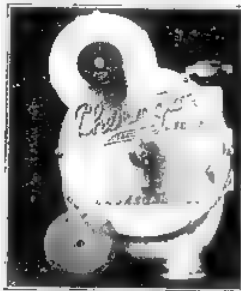
ZENITH RADIO CORP. • CHICAGO
America's oldest maker of fine radios
—always a year ahead



WATER MOTORS.

1908

THE BACKUS MOTOR is the cheapest power known for driving all kinds of light machinery. Water Companies advise the Backus. It stands without an equal. Also Gas and Gasoline Engines. Agents wanted. Send for special circular to
BACKUS WATER MOTOR CO., Newark N. J.

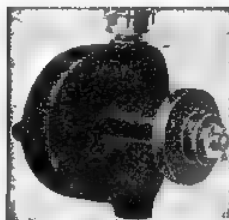


Only \$8 (for one month only) to introduce our new back-gear water motor. Accurately cut gears run in oil-tight case. All bearings bronze. For mechanical construction and efficiency this motor cannot be excelled. Its application is unlimited for small power. 40 lbs. pressure will run washing machine. 7-inch bucket wheel geared 7 to 1. Complete with two pulleys and emery wheel.

Don't let this, the best motor ever offered, get by you. Order at once. A good Christmas present for your boy. Fully guaranteed. Money back if not satisfied. Have a good proposition for agents Cherrington Mfg. Co., Waukegan, Illinois



1908



\$3.50 A Backus Water Motor

For Polishing, Grinding, and Power

Can be screwed on any faucet

BACKUS WATER MOTOR CO., Newark, N. J.

1909



SUPPLIES FROM HYDRANT PRESSURE the cheapest power known. Invaluable for blowing Church Organs, Ripping Printing Presses, Sewing Machines in Households, Turning Lathes, Scroll Saws, Grindstones, Coffee Mills, Sausage Machines, Feed Cutters, Electric Laths, Elevators, etc. It needs little room, no firing up, fuel, ashes, repairs, engineer, explosion, or delay, no extra insurance, no coal bills. Is noiseless, neat, and compact. Will operate at any pressure of water above 5 lb.; at 40 lb. pressure has 4-horse power, and capacity up to 10-horse power. Prices from \$15 to \$300. Send for circular to

THE BACKUS WATER MOTOR CO., Newark, N. J.

1887

"GET THE BEST"

which means

The Clipper Water Motor



We do not claim it THE CHEAPEST, but we do claim it THE BEST.

Send \$7.50 and get one of these 6-inch motors—regular price \$10. Send P. O. order, Registered letter or N. Y. draft.

L. E. RHODES, HARTFORD, CONN.

1908

Let the Red Devil

WATER MOTOR Do Your Work

An improved, patented, bucket-wheel construction that is scientifically and mechanically perfect. The most successful small water motor made. Our tremendous output brings the price down within the reach of every mechanic, every householder. Thousands are giving satisfaction. Each motor tested carefully and fully guaranteed.

Costs a Penny a Day to Run

Furnished complete with pulley, belt and different outfits. The most convenient and economical power for small tools, fans, blowers, etc. Used extensively by mechanics, dentists, druggists, grocers, butchers, plumbers, etc. In the home to run washing machine, sewing machine, grind knives, polish silver, etc.

4 in. Motor on 1/2 in. Pipe, 80 lbs. pressure, gives 1/8 H. P.
6 in. Motor on 1/2 in. Pipe, 80 lbs. pressure, gives 1/4 H. P.
6 in. Motor on 2 in. Pipe, 60 lbs. pressure, gives 1 H. P.

No. 1492 for grinding, polishing, buffing, run sewing machine, bottle washer, etc.

Price with emery wheel, buffing wheel, silver polish and pulley, \$3.00. Motor and Pulley only \$2.50. 1/2 horse power on 80 lbs. pressure, speeds 3000 to 5000 revolutions per minute.

4 inch Motor with Emery Wheel



6 inch Motor

No. 1992 for washing machine and a hundred other things.

Power for small tools. 1/2 horse power on 1/2 inch pipe, 80 lbs. pressure; 1 horse power on 2 inch pipe, 60 lbs. pressure. New net price, \$5.00 cash with order.



6-in. Motor and Washing Machine

Divine Water Motor Company
Dept. O
Ulva, New York, U. S. A.

For the name of your local hardware or tool dealer we will send you free booklet on

"THEORY AND DESIGN OF WATER MOTORS."



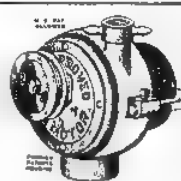
\$200 BALL BEARING FAUCET WATER MOTOR

Made of cast iron and not a toy, with emery wheel, polishing wheel, pulley, wrench and washers. A household necessity. Sharpens cutlery and tools, runs light machinery, etc. Don't delay. Order now. ONLY **\$200**

THE EDGAR MFG. CO.
104-P Hanover St. BOSTON, MASS., U. S. A.

1910

1911



Norton Improved Water Motor

Has the high speed required for grinding, polishing, etc. It also has a power side where the speed is reduced to 1000 Revolutions, thus making it an ideal motor for WASHING MACHINES with WRINGER ATTACHMENT. NO OPEN GEARS TO CATCH. Made of solid brass. Sent on receipt of \$8.50, express to be paid by receiver. Shipping weight 6 pounds. Norton Water Motor Co., Inc., Roslindale, Mass.



Faucet WATER MOTORS

Complete with emery wheel, buff wheel, pulley to run sewing and washing machine, polish. In some cities where we have no agents, and where the water pressure is good, a sample motor will be given free; apply at once if you want to make some extra money, or if you can devote your whole time, liberal salary and commission will be paid.

\$2.50 and up

ALCOHOL STOVES, LAMPS AND FLAT IRONS

ENGINEERS WANTED

to send for catalog of Indicators, Reducing Wheels, Planimeters. Address,

LIPPINCOTT M. S. CO.,

Newark, N. J. New Jersey



1908

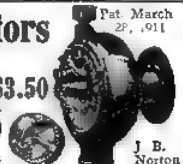
1911

"Norton" Water Motors Lead Them All

"Model B." for grinding, polishing, running fans, etc. **\$3.50**
"Norton Improved" with Patented combination shift gear, for flat or round belt **\$6.50**

Very powerful. Catalogue sent upon request

NORTON WATER MOTOR CO., Roslindale, Mass.



Pat. March 29, 1911

J. E. Norton

Water Motors Give Free Power

1906



OUR faucet water motors bring a hydraulic water plant into every home and workshop—cheapest power in the world. Our faucet water motors can be attached instantly to any threaded faucet. Quickly attached to any smooth faucet by our universal coupling. Faucet water motors are used for buffing, polishing and grinding. Sharpens scissors or other edged tools. Cleans silverware, cut glass, kitchen utensils and all metal surfaces. Runs all kinds of light machines like lathe, saw, fan, printing press, dynamo, washing machine, sewing machine, etc. Washes milk bottles, glasses, etc. We are dealers in water motors which give from one-sixteenth to ten horse power. We have large water motors for the purpose of running dental lathes, ice cream freezers, organ bellows, ceiling fan, etc. Our motors and accessories are fully described and illustrated in Morton's Water Motor Book. This book will be sent absolutely free to any one upon request. It is fully illustrated and contains seventy pages—largest water motor book in the world.

Morton's Little Marvel Faucet Water Motor outfit is now being sold for \$3.00 complete, consisting of water motor with strong, iron case, superior emery wheel, polishing and buffing wheels, seasoned wood pulley, polishing material, leather belting, wrench, oil can, screw driver, belt hook, and complete printed instructions. This outfit is worth \$6.00 at retail price, but a remittance of \$3.00 buys it. The Divine Faucet motor and complete outfit which we list at \$6.00 we sell for \$4.00. The Demon Hydraulic Engine, with substantial iron case, 6 inch water wheel, for power purposes, is now being sold by us for \$6.00. We will guarantee this motor to run any make washing machine or will return the money. This motor lists at \$10.00. Our price is \$6.00, with leather belting and pulley for either flat or round belting. Call and see the motors in operation, or write for free Water Motor Book. Send us \$3.00 for Morton's Little Marvel Water Motor. If it is not in every way satisfactory it may be returned at our expense and your money will be immediately refunded. **Agents Wanted.**

MORTON MFG. COMPANY, Dept. O, 130 Fulton Street, NEW YORK

—Don't Wait for the Rain—

No reason why you should, if you have a Deming Ram working for you. Once locate it properly, and your water supply is assured; a city system on your own property.

Pumping water by hand is hard work—useless, too, when you can get a Deming Ram to do it for you. Pumping engines and windmills get out of order—continually require attention. The Deming Ram needs practically none.

Farm help is costly and hard to get. That makes it all the more an object to you to cut down the work you have to *hire*, and do it with machinery that looks after itself and that does not loaf when your back is turned. The Deming Ram is always ready, always willing and does not get tired.

Do you have a spring or a flowing well? Write us the situation. We will tell you whether you can use a Ram, how much water it would deliver, and just what it would cost you to install it.

Let us submit an estimate; after that, the buying is "up to you." We ask now only your inquiry—may we have that?

THE DEMING COMPANY,

Salem, Ohio

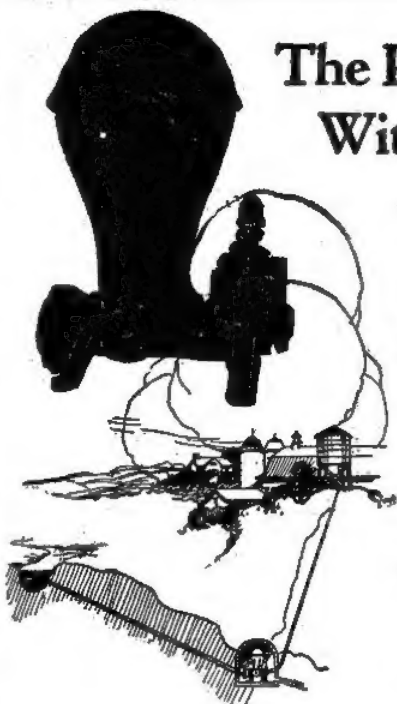
HENION & HUBBELL, *General Western Agents*, CHICAGO
OTHER AGENCIES IN PRINCIPAL CITIES

1904



Made in Seven Sizes

The Pump That Works Without Power Costs



In operation the ram uses the momentum of a slight fall of water from stream or spring to force water to an elevation many times that of the operating fall. Many capacities up to 100 gals. an hour.

Thousands of Goulds rams are supplying running water to farms, dwellings, hotels, factories and railway tanks without any cost for operation or labor.

Wherever adaptable, a Goulds ram gives efficient service and brings the full satisfaction that only an adequate supply of running water can give.

Goulds Pumps and Water Systems are of many types, sizes and capacities to meet the requirements of every farm or home. Through Goulds and Goulds dealers you can have adequate running water for all household and farm purposes at a surprisingly low cost.

Write for booklet giving details of our complete line of electric and engine driven pumps and water systems for every need.

The Goulds Manufacturing Company
Seneca Falls, N. Y.

Branches

Atlanta Chicago New York Pittsburgh
Boston Houston Philadelphia Washington

1924

GOULDS PUMPS

AND WATER SYSTEMS

1911



RUNNING WATER
WHEN AND WHERE YOU WANT IT
Water pumped day and night automatically from nearby stream, pond or spring. No expense; no attention; no repairs. A **FOSTER HIGH-DUTY RAM** is low in first cost and high in efficiency. No attention or expense to maintain. Write us for **Free Book** of helpful suggestions.
POWER SPECIALTY COMPANY
2125 Trinity Building, New York

1913



Hutchison Water Mill

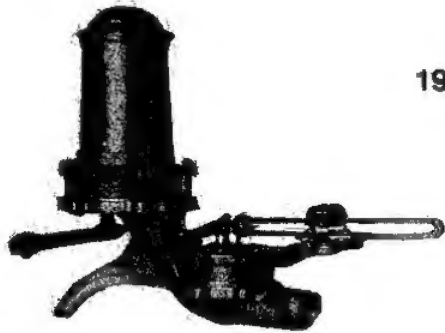
At last a constant supply of fresh running water, either from the power of your spring or from the small stream near by. Economy personified. The first cost the only cost—price, \$25.00, f. o. b. Wilkesburg. Write for descriptive matter. Agents wanted.

HUTCHISON MFG. COMPANY,
Dept. 4, Wilkesburg, Pa.

WATER RAMS

Making Water Pump Water.

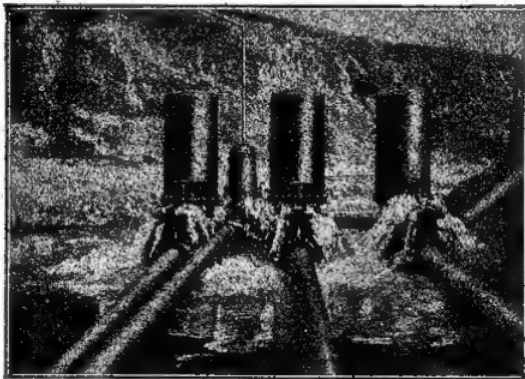
The coal scarcity, which is everywhere prevalent, has focused the attention of the Mexican railroad upon the necessity of using



1918

THE RIFE RAM

natural resources wherever possible for power purposes. As a result water-rams are now pumping water a distance of 10,000 feet for



RIFE RAMS AT WORK IN OLD MEXICO

the railroad shops and locomotive tanks of the Mexican railroad. One small ram is delivering water at the rate of 6,000 gallons a day at a height of eighty-five feet to a tank a thousand feet away.

Wherever there is a stream with a fall of three feet or more and a flow of not less than three gallons a minute, a ram may be easily installed at small expense. This clever little pump will furnish plenty of water at all times for use about the house, barns, lawn, garden, etc. It will run for months at a time without requiring a moment's attention.

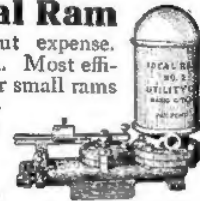
It needs no fuel or oil. If desired, it may be connected with a water pressure system or it will supply water under sufficient pressure to operate an overhead irrigation plant.

This method of pumping water can be adopted on many farms. The rams used by the Mexican railroad are Rife rams made by the Rife Engine Co., New York City.

Use the Ideal Ram

Pumps water without expense. Operation guaranteed. Most efficient ram made. Our small rams will pump under conditions where no others will. Plans free.

UTILITY CO.
Box E, Basic City, Va.



1914

Sell this Labor-Saving Pump

Scarcity of farm help is compelling farmers to adopt every labor-saving convenience. One of the most necessary of these is running water in house and barns. Every farmer in your community who has a stream with a capacity of three gallons or more per minute and a fall of at least three feet should have a

RIFE RAM

It pumps day and night, week days and Sundays. There's nothing to give out or demand attention. It uses no fuel and never freezes. It may be easily installed without expert labor. Can be used with or without an air pressure system. Also singly or in batteries for irrigation pumping.

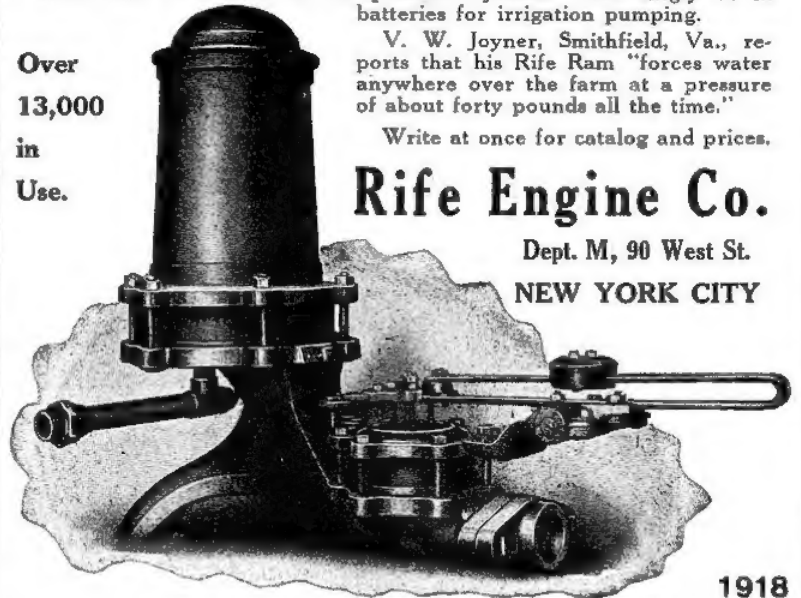
V. W. Joyner, Smithfield, Va., reports that his Rife Ram "forces water anywhere over the farm at a pressure of about forty pounds all the time."

Write at once for catalog and prices.

Over
13,000
in
Use.

Rife Engine Co.

Dept. M, 90 West St.
NEW YORK CITY



1918

Cheap Running Water Supply for Farm and Home. Costs nothing to operate—gives all year round running water supply to all parts of your home, barn, stables, troughs, etc. If you live near a spring or flowing stream install a

NIAGARA HYDRAULIC RAM

More comfort for your family—better for your stock—saves labor. Doesn't need attention—can't get out of order. Prices really low. Free booklet.

NIAGARA HYDRAULIC ENGINE CO.
P.O. Box 1008, Chester, Pa.



1912



HANSON HYDRAULIC RAM.

The most efficient Ram in the market. For size and price send for circular.

HANSON & RHODES.
127 West 32d Street, New York.

1900



GAWTHROP HYDRAULIC RAM

Why do people prefer IT? Because it is the BEST. For size and prices, send for circular. ALLEN GAWTHROP, Jr., 100 W. 4th St., Wilmington, Delaware.

1900

HOW A RAM OPERATES

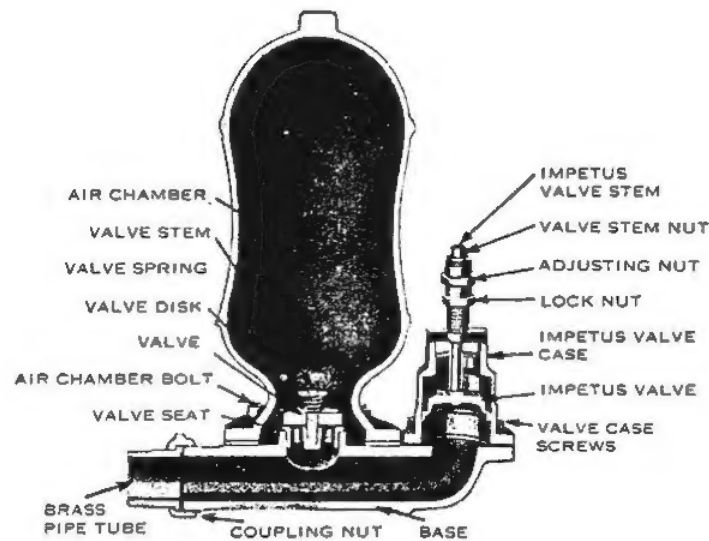


Fig. 690
Cross Section

Deming Hydraulic Ram

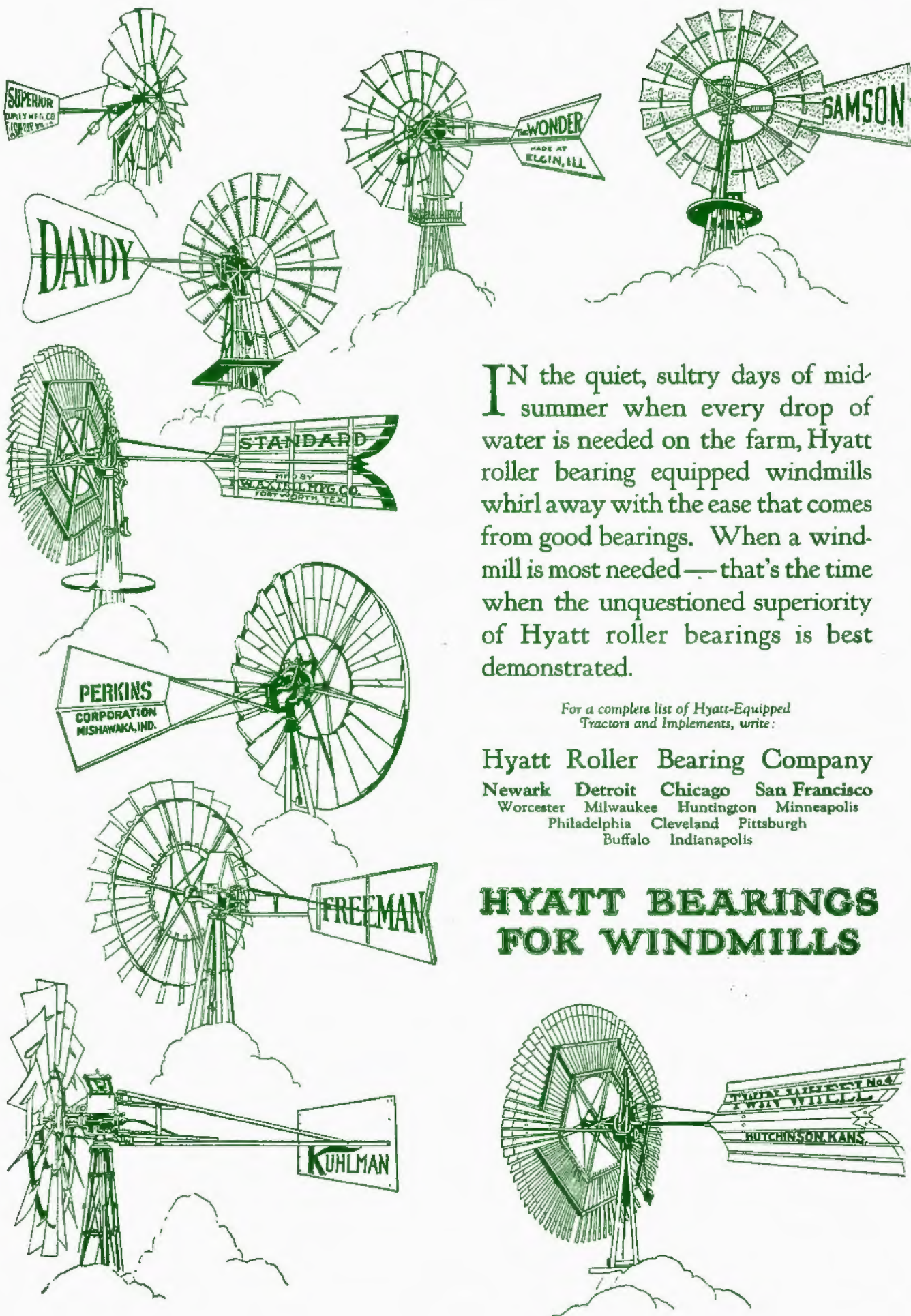
Fig. 690

A DEMING Hydraulic Ram installed at a spring means a constant supply of fresh water in the home at practically no operating expense.

Deming Hydraulic Rams are used to elevate a part of the water supply to a point higher than the level of supply. The machine in its simple form consists of a body to which is attached an impetus or overflow valve, and an air chamber under which is a check valve.

In operation the supply water flows into the ram body through a drive pipe and passes out through the impetus valve until the column attains sufficient speed to raise this impetus valve to its seat. With no other means of escape, a small quantity of this water is forced through the check valve into the air chamber, compressing the air slightly, when the check valve closes and prevents it from returning to the drive pipe. the air, being then at a pressure greater than that due to the head in the discharge line, forces this small quantity of water into the supply tank.

At the moment the check valve closes, the column of water in the drive pipe rebounds a short distance, which removes the pressure from the impetus valve and permits it to open of its own weight. This completes one cycle. These movements continue automatically.



IN the quiet, sultry days of mid-summer when every drop of water is needed on the farm, Hyatt roller bearing equipped windmills whirl away with the ease that comes from good bearings. When a windmill is most needed — that's the time when the unquestioned superiority of Hyatt roller bearings is best demonstrated.

For a complete list of Hyatt-Equipped Tractors and Implements, write:

Hyatt Roller Bearing Company

Newark Detroit Chicago San Francisco
Worcester Milwaukee Huntington Minneapolis
Philadelphia Cleveland Pittsburgh
Buffalo Indianapolis

**HYATT BEARINGS
FOR WINDMILLS**